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ANTIBIOTIC EFFICACY IN GASTRO-ENTERITIS

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There have been few controlled studies of the efficacy of antibiotics and chemotherapeutic agents in the treatment of non-specific gastro-enteritis and dysentery. A comprehensive investigation[1] into the effects of sulphadiazine, aureomycin and chloromycetin on non-specific gastro-enteritis in children under 1 year of age, was conducted by the Medical Research Council in Britain. The results suggested that sulphadiazine and chloromycetin were the most effective, and that the effect of aureomycin was only a little better than supportive therapy alone. On the other hand, Shanks[2, 3] found aureomycin, chloromycetin and terramycin ineffective in the treatment of non-specific gastro-enteritis.

Nearly all papers dealing with the response to antibiotics of bacillary dysentery and Salmonella infections are based on small series of cases and often lack controls. However, in the treatment of a series of 1,408 adults suffering from Shigella dysentery, Garfinkel *et al.*[4] found sulphonamides and polymyxin B ineffective, chloromycetin moderately effective and terramycin and aureomycin very effective.

These conflicting reports induced us to conduct an investigation into the value of sulphonamides, terramycin and chloromycetin in the treatment of diarrhoeal disorders, which are the commonest disabilities of children attending this hospital. The specific drugs used in the treatment of diarrhoeal disorders are in themselves dangerous, and we have seen lower-nephron nephrosis in children treated with sulphonamides, and severe moniliasis, fatal staphylococcal enterocolitis and aplastic anaemia in cases treated with antibiotics. In view of the fact that we have to treat many thousands of cases of diarrhoea as outpatients, who cannot be supervised satisfactorily, it is particularly important to ascertain whether these potentially dangerous agents are of therapeutic value in these cases.

METHODS AND MATERIAL

A consecutive series of 241 children with the major complaint of diarrhoea admitted to one of the wards of this hospital were studied during the summer 1954-55. All the cases were less than 2 years of age. All were suffering from a severe attack of diarrhoea, 93% requiring intravenous fluid therapy.

The drugs on trial were a sulphonamide preparation*, terramycin and chloromycetin. They were given for a period of 6 or 7 days, the sulphonamide in divided doses of 90 mg. (1½ gr.) per lb body-weight per 24 hours, terramycin in divided doses of 20 mg. per lb body-weight per 24 hours, and chloromycetin in divided doses of 40 mg. per lb body-weight per 24 hours. Every fourth case was used as a control and received no antibiotics or chemotherapy except that penicillin was given intramuscularly where this was indicated for parenteral infections. Penicillin was avoided where terramycin and chloromycetin were being used, because of possible antagonistic effects.[5] In addition the usual dietetic and other supportive therapy was given.

Rectal swabs were taken as soon as possible and always within 18 hours of admission. The drugs were prescribed after rectal swabs had been taken. Allocation to the various treatment-groups took place within the first 24 hours and always before the results of rectal swab cultures were known.

Of the 241 cases, 71 (29%) had Shigella or Salmonella infections; 25 of these had Salmonella infections and the remaining 46 were suffering from Shigella infections comprised of 13 Sonne, 28 Flexner, 3 Newcastle and 2 Schmidtz. One of the cases with Sonne dysentery also had Salmonella organisms in his stools.

During the early stage of the investigation we gained the impression that terramycin and chloromycetin were beneficial in the severe cases. It was then decided that cases in the sulphonamide or the control series who were not progressing favourably would have their treatment changed to either chloromycetin or terramycin.

Results of the investigation were assessed by mortality rates, duration of stay in hospital, and relapses. Only

* Consisting of equal parts of sulphadiazine, sulphathiazole and sulphamezathine.

those cases which became sufficiently dehydrated to warrant resumption of intravenous therapy were considered as relapses.

RESULTS OF INVESTIGATION

The results of the investigation are shown in Table I.

Sulphonamides were given to 59 cases, of whom 39 were found to be suffering from non-specific gastro-enteritis. Of the 39 cases, 7 (18%) died. The average duration of stay in hospital of the 32 cases who recovered was 13 days and 7 of the cases relapsed. The remaining 20 cases in this treatment-group showed Shigella or Salmonella infections; of these, 7 (35%) died. The average duration of stay in hospital of the 13 cases who recovered was 11 days; 3 cases relapsed.

Terramycin was given to 60 cases, of whom 45 had non-specific gastro-enteritis. Of the 45 cases, 10 (22%) died. The average duration of stay in hospital of the 35 cases who recovered was 10 days and 10 of the cases relapsed. The remaining 15 cases in this treatment-group showed Shigella or Salmonella infections; of these, 5 (33%) died. The average duration of stay in hospital of the cases who recovered was 9 days; 4 cases relapsed.

Chloromycetin was given to 60 cases, of whom 46 had non-specific gastro-enteritis. Of the 46 cases, 8 (17%) died. The average duration of stay in hospital of the 38 cases who recovered was 9 days and 5 of the cases relapsed. The remaining 14 cases in this treatment-group showed Shigella or Salmonella infections; of these 4 (29%) died. The average duration of stay in hospital of the cases who recovered was 11 days; no cases relapsed.

The control group of 62 cases consisted of 40 cases of non-specific gastro-enteritis. Of these 40 cases, 10 (25%) died. The average duration of stay in hospital of the 31 cases who recovered was 15 days and 3 of the cases relapsed. The remaining 22 cases showed Shigella or Salmonella infections, and of these 11 (50%) died. The average duration of stay in hospital of the cases who recovered was 13 days; 10 cases relapsed.

Table II summarizes the results of the 24 cases in the sulphonamide and control group where treatment was changed to terramycin or chloromycetin. Fifteen (63%) of these cases recovered.

Out of the total of 241 cases 61 (25%) died; 27 (44%) of these deaths occurred in cases with Shigella or Salmonella infections.

COMMENT

This investigation was undertaken because of lack of unanimity about antibiotic efficacy, particularly in the treatment of non-specific gastro-enteritis.

In non-specific gastro-enteritis there was no striking difference in respect of mortality and relapse rate between the treated and the control groups. The average duration of stay in hospital was shortest in the cases receiving terramycin and chloromycetin.

However, in the cases suffering from infections with Shigella or Salmonella organisms, the mortality rate was lowest in the group receiving chloromycetin and considerably higher in the control group (50%) than in any other group in this investigation. The average duration of stay in hospital was lowest in the cases receiving terramycin and there were no relapses among the cases receiving chloromycetin.

TABLE I

Treatment Groups	*Types of Gastro-enteritis*	*Cases*	*Average Duration of Stay (days)*	*Cases receiving Intravenous Therapy*	*Relapses*	*Deaths*	
						Number	*Per cent.*
Sulphonamide 59 cases	Non-specific	39	13	37	7	7	18%
	Shigella and Salmonella	20	11	19	3	7	35%
Terramycin 60 cases	Non-specific	45	10	39	10	10	22%
	Shigella and Salmonella	15	9	12	4	5	33%
Chloromycetin 60 cases	Non-specific	46	9	43	5	8	17%
	Shigella and Salmonella	14	11	12	0	4	29%
Controls 62 cases	Non-specific	40	15	38	3	10	25%
	Shigella and Salmonella	22	13	22	10	11	50%

TABLE II. EFFECTS OF ANTIBIOTIC CHANGES

Treatment Groups	*Types of Gastro-enteritis*	*Changed to Chloromycetin*		*Changed to Terramycin*	
		Recovered	*Died*	*Recovered*	*Died*
Sulphonamide	Non-specific	3	1	—	—
	Shigella and Salmonella	2	1	1	1
Controls	Non-specific	3	—	—	—
	Shigella and Salmonella	3	4	3	2
	Totals	11	6	4	3

Owing to unsatisfactory progress of the disease, treatment in 24 cases of the sulphonamide and control groups was supplemented with terramycin and chloromycetin. All these were severe cases, and in 17 Shigella or Salmonella organisms were recovered from stools. It would appear that these changes in therapy were beneficial and 63% recovered.

It would appear from these comparative results that terramycin and particularly chloromycetin are indicated in the treatment of Shigella and Salmonella infections. In non-specific gastro-enteritis the beneficial effects of these drugs is less evident.

I wish to thank Dr. E. Kahn for his encouragement and helpful criticism of this article and Drs. Altman, Freiman, Griffiths and Rabinowitz for their help in accumulating the data for this investigation. I am indebted to Dr. J. D. Allen, Superintendent of Baragwanath Hospital, for permission to publish this paper.

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TUBERCULOSIS AND INDUSTRY

The Cape sub-group of the South African Society for Industrial Health, a group of the Medical Association, held a meeting in Cape Town on 12 October 1955, which was open to industrialists and industrial nurses.

Dr. H. L. Ackerman, Deputy Tuberculosis Officer, City of Cape Town, addressed the meeting on *The Place of the Tuberculotic in Industry*. He stated that the incidence of tuberculosis in industrial workers was difficult to assess, as it was almost impossible to examine every employee in industry, and some employers were reluctant to supply figures of the numbers employed by them. In some callings there was a reputed high incidence rate of pulmonary tuberculosis: hairdressers, who formerly worked for long hours in a bad atmosphere; seamen, who previously worked long hours and lived in cramped quarters, but in whom better living conditions had resulted in a reduction of cases; mine-workers in mines where the silicosis rate was high; barmen, who not only worked long hours, but often had a high alcohol-intake. A very high ratio occurs among domestic servants and pregnant women. It was regretable that few employers of domestic servants used the facilities offered by the clinic. In the clothing industry in Durban, of 7,000 employees examined 100 were found to be active cases of tuberculosis.

The size of the factory bore no relation to the incidence of tuberculosis among the workers, but cross-infection did depend on the processes employed, and the siting of the workers. Elimination of risk must be sought in regular annual mass X-ray of all employees. Although pre-employment examination was helpful in eliminating potential sources of infection, this alone was not enough, workers frequently developed tuberculosis subsequently and introduced it into the factory.

EARLY DIAGNOSIS AND MASS X-RAY

Early diagnosis held obvious advantages, especially as the onset of the disease was insidious and often painless. For this reason, employees who were frequently absent from work with minor ailments, or who showed loss of attention, should be sent for special examination.

Mass X-ray was available to employers in the Cape Town municipal area free of charge. In 1949 the number of employees examined was 20,402, and in succeeding years 35,303, 45,643, 62,000 and 61,000. Of these approximately 15% were not resident in the municipal area. Incidence among factory workers, as shown by mass X-ray had diminished over the last 3 years. The highest figures were among pre-employment examinees and pregnant women. Once diagnosed, the tuberculous worker is given free treatment, and financial help is available from public and private sources.

Fitness to return to work is not easy to assess, and employers should obtain a certificate of fitness from a medical practitioner who has had extensive experience in pulmonary tuberculosis before the worker is re-employed. The method of assessment should be that radiological examination shows a stabilized lesion for approximately 3-4 months, the patient should be non-infectious and willing to work. Induction to full activity should be gradual. When necessary, treatment should be given while at work.

REHABILITATION

Rehabilitation was important from the physical and mental aspect. Prolonged isolation sometimes induced a fear in the patient that when he returned to work he might break down. The work with which he was familiar was often easier to perform than an entirely different form of work, so that it was better for him to be replaced in a job similar to the one he left.

There was no organized rehabilitation in the Union, except at sheltered employment which absorbed a few cases of tuberculosis. On the Cape Flats, Cafda was now carrying out rehabilitation on a small scale. Standards of entry to rehabilitation centres should not be placed too high, since the very fit workers could probably return to their old employment.

Chances of breakdown were not high if adequate treatment was given. There should, however be a testing period on return to work, during which the patient should have regular meals and regular hours and should limit smoking and drinking. A large number of re-admissions for treatment were heavy drinkers.

The prejudice which still exists in some quarters against employing persons who have recovered from tuberculosis is without foundation. There is far less risk in the known case than from the undiscovered patient who may be a source of infection.

Summing up, the method of controlling tuberculosis was by elimination and treatment of early cases, moral and financial aid during illness, and re-employment on a reasonable basis.

During discussion Dr. Ackerman paid tribute to Cape Town employers whose co-operation in sending their workers for mass X-ray and pre-employment examination was good. Answering a question on the possibility of infection, he stated that, with the patient's consent, the employer was informed in the case of infection remaining, and very often employment was found for the patient in such occupations as night watchman or clerk, away from contact with others. He did not think that the administration of BCG to the population as a whole was practicable, but rather to selected persons. Sheltered employment was not really desirable; it was far better to break down the patient's reluctance to return to his normal work.

On the question of a mobile X-ray unit Dr. Ackerman stated that as some employers of large groups of workers near the clinic had not taken advantage of the service, whereas employers some miles distant had gone to some trouble to use it, he did not think that a mobile unit was called for at present. The static machine had very definite advantages over the mobile, and he doubted whether there was much difference in the time factor when cases were examined.

Mr. Simon Roy thanked the speaker for a most interesting and informative evening, and hoped that the Society for Industrial Health would offer further opportunity to industrialists to discuss mutual problems with the medical profession.

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VAN DIE REDAKSIE

PLASMA-LIPOPROTEÏENE

Nadat hulle in die derm deur die aksie van ensieme en gal gehidroliseer, verseep, ge-emulgeer en afgebreek is, verbind die vetsure wat uit die dieetvet afkomstig is in die dermslymvlies met gliserol, om sodoende neutrale vette te vorm, of word hulle gefosforileer om fosfolipiede te vorm. Op 'n soortgelyke manier kom cholesterol esters die dermslymvlies binne. Vet gaan dus regstreeks in die bloed op, of anders deur die borslimfbuis as kolloïdale fosfolipiede en cholesterol esters, in die vorm van baie klein (chilomikroniese) druppeltjies, waarskynlik omhul van 'n proteïenlagie. Die inhoudshoogte van lipiede in die bloed spruit voort uit die verskuiwing van lipiede vanaf die liggaamsdele waar hulle geabsorbeer, gevorm, of neergelê word na die dele waar hulle gebruik, bewaar of uitgeskei word.[1] Die lipiede is nie vry in die bloed nie, maar vorm prostetiese groepe in besondere plasma-proteïene (lipoproteïene) van swaar molekulêre gewig. Die lipoproteïene vervoer diëtiese vet na die lewer of na die vetweefsel; hulle dra hersintetiseerde vet vanaf die lewer na bewaarplekke of na die weefsels, en hulle vervoer vet uit die bewaarplekke na die lewer en na die periferale dele van die liggaam.

Weens hierdie ingewikkelde dinamiese proses wissel die waardes van plasma-lipiede aansienlik. Chemiese bepaling van plasma-lipiedfraksies lewer slegs 'n onvolledige indruk van die vervoer en stofwisseling van vet. Die bepaling van die cholesterol-fosfolipied verhouding (C/F) en in besonder die bepaling van lipoproteïene, verskaf egter meer inligting, maar ongelukkig is die metodes wat in hierdie navorsing gebruik word baie ingewikkeld. In een werkwyse word Svedberg se metode van ultra-uitswaai toegepas om die verskillende fisiese kentekens van lipoproteïene te bestudeer.[2,3] Lipoproteïenstowwe kan onder verskillende molekulêre groottes en digtheid geklassifiseer word volgens hul beweging- of flotteringsnelheid gedurende die ultra-uitswaaiproses. Die eenheid is bekend as die Svedberg-flotteringeenheid (Sf). Dit is bevind dat molekules met lae flotteringsnelhede—molekules van lae digtheid (Sf onder 100)—groter hoeveelhede cholesterol bevat as molekules met hoër flotteringsnelhede (Sf oor 100) wat ryk is aan neutrale vette en fosfolipiede. Na 'n vetryke maal weerspieël die patroon die omskakeling van molekules van hoë digtheid tot molekules van lae digtheid. Die afbreek en gebruik van neutrale vette

EDITORIAL

PLASMA LIPOPROTEINS

After being hydrolysed, saponified, emulsified and degraded in the intestine by the action of enzymes and bile, the fatty acids derived from dietary fat combine within the intestinal mucosa with glycerol to form neutral fats or are phosphorylated to phospholipids. Cholesterol esters enter the intestinal mucosa in similar fashion. Fat thus enters the blood directly or through the thoracic duct as colloidal phospholipids and cholesterol esters in the form of minute (chylomicrous) droplets covered probably with a protein layer. The blood lipid level is the resultant of the shifting of lipids from the sites of their absorption, formation or deposition to the sites of their utilization, storage or excretion.[1] The lipids are not free in the blood stream but form prosthetic groups in specific plasma-proteins (lipoproteins) of high molecular weight. Lipoproteins carry dietary fat to the liver or to adipose tissue; they carry re-synthesized fat from the liver to storage depots or to the tissues, and transport depot fat to the liver and the periphery.

In view of this complex dynamic state the values for plasma lipids are wide in their range. The chemical determination of plasma-lipid fractions only gives an incomplete impression of the transport and metabolism of fat. However, the determination of the cholesterol-phospholipid ratio (C/P), and particularly of lipoproteins, gives more information; unfortunately the methods used in these studies are complicated. In one procedure Svedberg's method of ultracentrifugation has been applied in studies of the different physical characteristics of lipoproteins.[2, 3] According to their migration or flotation rate under ultracentrifugation the lipoprotein substances of different molecular size and density can be classified. The unit is called a Svedberg flotation unit (Sf). Molecules with low flotation rates—molecules of low density (Sf below 100)—are found to contain larger amounts of cholesterol than molecules of high flotation rates (Sf 100 and above) rich in neutral fats and phospholipids. After a fatty meal the pattern shows the transformation of molecules of high density

en vetsure mag by sekere siektes betekenisvolle veranderings toon. Die bloedwei by pasiënte met slagaarvervetting en sklerose en met kroonslagaar-kwale toon bv. 'n hoë gehalte van lipoproteïene van Sf 12-20 en Sf 20-100; insgelyks by swaarlywige persone.[4]

Die studie van lipoproteïene en cholesterol-lipied verhoudings was van waarde by die vraagstuk van die verhouding tussen lipiedmetabolisme en vervetting van die slagare. Dit is 'n bewese feit dat die kolloïdale staat van cholesterol van groter belang is as die absolute hoeveelheid daarvan. Dus, *afgesien* van die hoeveelheid cholesterol in die bloed, kom vervetting van die slagare skynbaar voor bv. wanneer lipoproteïene van Sf 20-100 vermeerder word. Indien cholesterol verbind is met lipoproteïene van hoë flotteringsnelhede, of met alfaglobuliene, en as 'n hoë fosfolipied-inhoud terselfdertyd die cholesterol in kolloïdale suspensie hou, kom slagaarvervetting skynbaar nie voor nie, selfs al is daar te veel cholesterol in die bloed. Die hoë voorkomssyfer van slagaarvervetting is die gevolg van die kolloïdale onbestendigheid van cholesterol in die bloed, soos weerspieël in die patroon van lipoproteïene en in die abnormale verhouding tussen cholesterol en fosfolipiede. Die Sf 12-20 lipoproteïene en die beta-globulienfraksie van cholesterol is hoër by jong mans as by jong vrouens. Hierdie feit suggereer die gebruik van estrogene, maar verdere navorsing is nodig om die waarde van estrogene toe te lig. Ook ander stowwe is proefsgewys bestudeer, soos bv. heparien wat, in klein dosisse, die Sf 12-20 lipoproteïenfraksies verminder en slagaarvervetting vertraag. Die hele onderwerp van vetmetabolisme, swaarlywigheid, 'n oormatige hoeveelheid cholesterol in die bloed en slagaarvervetting is besaai met probleme, en is so lewensbelangrik dat geen moeite ontsien moet word om die probleme op te los nie. Waarneming in die fynste besonderheid verg ons noukeurigste aandag.

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into molecules of low density. The degradation and utilization of neutral fats and fatty acids may show significant changes in certain disorders. For example in the sera of patients with atherosclerosis and coronary-artery disease high values have been demonstrated for lipoproteins Sf 12-20 and Sf 20-100, and similar findings in obese subjects.[4]

The studies of lipoproteins and of cholesterol-lipid ratios have been of value in the problem of the relationship between lipid metabolism and atherogenesis. The colloidal state of cholesterol has been shown to be of more importance than its absolute amount, and so, regardless of the blood-cholesterol level, atherogenesis appears to occur when, for example, lipoproteins of Sf 20-100 are increased. If cholesterol is bound to lipoproteins of high flotation rates or to alpha globulins, and if at the same time a high phospholipid content holds the cholesterol in colloidal suspension, no atheromata seem to form even in the presence of hypercholesterolaemia. The high incidence of atherosclerosis results from colloidal instability of the blood cholesterol as demonstrated in the lipoprotein patterns and in the abnormal cholesterol-phospholipid ratio. The Sf 12-20 lipoproteins and the beta-globulin fraction of cholesterol are higher in young men than in young women. This has suggested the use of oestrogens, but further work is needed to elucidate their value. Other substances have also been studied experimentally; for example heparin, which in small doses decreases the Sf 12-20 lipoprotein fractions and retards atherogenesis. The whole subject of fat metabolism, obesity, hypercholesterolaemia and atherosclerosis bristles with difficulties and is of such vital importance that no effort should be spared to solve its problems. Detailed observations are in need of our fullest attention.[1]

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THE MANAGEMENT OF CARDIAC ARREST DURING SURGERY

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Cardiac arrest may be defined as a condition of asystole, with or without ventricular fibrillation, which is precipitated by the effects of anaesthesia, surgery, or of both in combination. The first death during anaesthesia is recorded as having occurred in January 1848. Ether was the anaesthetic used and there is sufficient evidence in this case to suggest that death followed cardiac arrest.[1] The earliest work on cardiac resuscitation is the experimental study of Schiff in 1874. He restored a normal heart-beat in dogs by means of massage, after producing arrest with chloroform. Niehaus and Berne in 1899 first attempted resuscitation in a human patient, but the first completely successful recovery in man was reported in 1902 by Starling and Lane, who used subdiaphragmatic massage.[2]

Incidence

Cardiac arrest is variously reported as occurring once in every 600 to once in every 3,000 operations. In units where much cardiac surgery is being done the incidence will obviously be higher, but it can be generally stated that in a busy theatre doing general surgery one or two cases may be expected each year.[3,4,5] The management of cardiac arrest is often bad, and frequently it is not attempted. This is due to a lack of preparedness on the part of the surgical team and

theatre nursing-staff. The number of successful resuscitations in the larger reported series has ranged between 10% and 40%,[3,4,6,7] and it is only by means of a studied plan of action divorced from the drama of the incident that lives will be saved and cardiac action restored before irreparable brain damage has occurred.

Etiological Factors and their Prevention

1. Myocardial anoxia is *the* most important factor in precipitating cardiac arrest. It may be due to respiratory obstruction or respiratory insufficiency from any cause, or it may be due to underventilation. Inadequate ventilation not only results in hypoxia but is associated with CO_2 accumulation and respiratory acidosis. During controlled respiration there may be pauses in ventilation lasting 1½ minutes while the anaesthetist may be regulating a drip, attending to tracheal secretions, recording the blood pressure, etc., and this may result in a doubling of the partial pressure of CO_2 in the blood.[8] More trouble has arisen from inadequate ventilation than from any other single cause, and in a poor-risk or complex case the person responsible for ventilation should have assistance in his duties at the head of the table. The surgeon himself is often the first person to recognize inadequate oxygenation of the blood and should report the fact whenever it is observed. In dogs hypoxia from positive-pressure ventilation with 100% nitrous-oxide and soda-lime absorption causes asystole in 8 minutes which is a ventricular standstill. Asphyxia with CO_2 accumulation usually results in ventricular fibrillation.[3] Rapid elimination of hypercapnoea by oxygenation may precipitate ventricular fibrillation and should be guarded against.

2. The heart is very sensitive to rapid loss of blood, and this is particularly seen when haemorrhage occurs from the heart itself at cardiotomy. This haemorrhage can often be prevented with adequate tourniquet technique and must be immediately controlled when it occurs, since a large proportion of the stroke volume is being lost which cannot be adequately replaced by peripheral infusion before the aortic pressure falls and the coronary flow is impaired. A more peripheral haemorrhage has similar though less immediate effects.

3. Vagal stimulation predisposes to cardiac arrest by inhibiting heart action. It is much more likely to produce arrest in the presence of hypoxia;[3] for this reason the patient should be well oxygenated before the endotracheal tube is inserted or removed, the insertion or removal should be carried out with as little trauma as possible. These precautions are also important if immediate post-operative bronchoscopy is required, particularly in older people after pulmonary resection. For the same reason, visceral traction in the abdomen or thorax should be gentle.

4. Anaemia, hypovolaemia, hypermetabolism and electrolyte imbalances may all contribute to anoxia and should be corrected before operation. Overdosage of anaesthetic drugs is an obvious cause of cardiac arrest. Diodone given intravenously produces a peripheral vaso-dilatation and fall in blood pressure and, when used during angiocardiography, particularly in cases of cyanotic heart disease, may result in diminished coronary flow, and so precipitate ventricular fibrillation. This latter fact serves to emphasize the fact that facilities for resuscitation should be available in X-ray departments where major diagnostic investigations are performed, such as angiocardiography, arteriography, cardiac catheterization and bronchography under anaesthesia.

Cardiac arrest is not due to some mysterious entity like 'status thymolymphaticus' and a diligent search will almost always reveal the cause. Whatever the cause, adequate oxygenation, gentleness, minimum anaesthesia and maximum blood-flow are the best preventive measures.[3]

Diagnosis

During cardiac surgery the event needs no herald and treatment can be immediate. With other thoracic operations asystole is usually quickly appreciated, although this is not invariable and the anaesthetist may be the first to give the alert. One has on occasion observed the onset of bradycardia during pulmonary resection, and when it is noticed trouble may be averted if a cause is immediately sought. Inflation with 100% oxygen, cessation of hilar traction, and sometimes the deflation of the cuff of the endotracheal tube, have restored more satisfactory cardiac action. Bradycardia is usually preceded by tachycardia and elevation of the blood pressure—earlier signs of anoxia. During other procedures the surgeon may be stimulated to action by the absence of bleeding or the colour of blood, but here again it is usually the anaesthetist who sounds the alarm.

In the abdomen the aorta should be immediately palpated to confirm the diagnosis, which, however, is usually in little doubt. This is no time for meditation or consultation. To go looking for a stethescope to confirm the diagnosis is wasting time, and time is now the all-important factor. To restore an effective blood-flow to the brain is mandatory if intellect is to be preserved, and the 3-4 minutes in which this must be done are probably nearing their end by the time the diagnosis is established. It should take no longer than 15 seconds to open the left chest in the 4th or 5th interspace to start cardiac massage. A scalpel is all that is required and the refinements of skin antiseptics, wound towels and washed hands are unimportant—'a live proposition is better than a dead certainty'.

TREATMENT

The anaesthetist should keep the lungs ryhthmically ventilated with 100% oxygen through an endotracheal tube, and Trendelenberg the table 5-10°. If the abdomen is open the surgeon should immediately commence sub-diaphragmatic cardiac massage with counter pressure against the sternum anteriorly. Many hearts in asystole have undoubtedly been resuscitated quickly in this manner, but this statement is made with an important proviso: If cardiac action has not been effectively established within 15-20 seconds this method is ineffective and the transpleural approach is then the only efficient method of resuscitation. The abdomen should never be opened primarily to initiate massage.

The method of choice is the transthoracic route by means of a submammary incision in the left 4th or 5th interspace, followed immediately by extrapericardial massage until an assistant can spread the ribs either manually or with a retractor to allow the operator the exposure required to incise the pericardium widely anterior to the phrenic nerve. Division of a costal cartilage may also be necessary if room is limited. Two hands can now be used comfortably if the heart is big, and accurate intracardiac injections can be given into the ventricle or auricle as required. This is also the only efficient way of determining whether the asystole is associated with ventricular fibrillation or whether an asystole with standstill is present. A coarse fibrillation may be palpable as a 'bag of worms' through the pericardium, but a fine fibrillation may be impalpable extrapericardially. The presence or absence of fibrillation influences treatment.

Technique of Massage

The word massage gives a wrong impression of what is being attempted, which in effect is rhythmical intermittent compression. This compression can only be regarded as efficient if it maintains an adequate peripheral pulse palpable by the anaesthetist or some other observer, and keeps the patient a reasonably good colour. The arterial blood can be kept red provided ventilation is adequate. It must be appreciated that there are reports of complete functional recovery in patients whose circulations have been maintained manually for periods of up to 82 minutes.[7,9] A patient with asystole occurring in the presence of an unrelieved cardiac-valve obstruction can rarely be resuscitated until the obstruction has been relieved by valvotomy, and the latter must be performed first before massage is commenced.[7]

In the massage, attention to detail is important. Compression should be gradual and relaxation abrupt. The most efficient rate is between 50 and 60 compressions a minute. This will maintain circulation and allows the operator to continue for a reasonable length of time without manual cramp. Massage must be interrupted at regular short intervals of a few seconds to allow spontaneous beats to develop. Ventricular filling should be palpable between each compression.[10] Mechanical stimulation can be overdone, and haemorrhage within the ventricular wall is almost always seen in hearts examined at autopsy. This event is not necessarily irreparable and probably accounts for a period of hypotension in cases who recover, and also for ECG changes, particularly bundle-branch block.

If the heart is large it is best compressed between two hands. If one hand is used counter-pressure should be made with the thenar eminence and not the thumb. The palmar surfaces of the fingers and not the tips must be used for compression, and it is quite easy to puncture the ventricle if this precaution is not taken.[7] It may require 3-5 minutes for full myocardial oxygenation if anoxia has been present, and massage should be continued until myocardial tone and colour have been regained. This usually also occurs within 3-5 minutes. If spontaneous heart action has not resulted by this time drug treatment, with or without electrical stimulation, becomes necessary. It must be emphasized, however, that massage is the mainstay of treatment. Electrical defibrillation may be vital, but ventricular fibrillation can be reversed by cardiac massage alone, which should be given a reasonable trial.[7] Certain drugs are helpful adjuvants but there is little reason in injecting a multiplicity of drugs in hopeful anticipation.

Asystole with Ventricular Standstill

It has been recommended—and the advantages are obvious—that all drugs kept in readiness for use in this emergency should be made up in 10 c.c. dilution.[3] This obviates the need for working out and measuring fractional dosage at a time when seconds are important. Dilution of this degree also allows more even distribution of the drug when it is injected.

With standstill present after adequate massage lasting 3-5 minutes, 0·5 c.c. of 1/1000 adrenalin (diluted to 10 c.c.) should be injected into the left ventricle. If this is ineffective after further massage for 2-3 minutes 3 c.c. of 10% calcium chloride (diluted to 10 c.c.) should be injected and massage continued. Both these drugs in this dosage should be repeated in turn if no response is obtained, but one or the other is usually effective if the patient is going to survive.

Asystole with Ventricular Fibrillation

Ventricular fibrillation is recognized as an uncoordinated ripple-like contraction, which may be coarse and easily palpable or fine and impalpable. If massage after 3-5 minutes has failed to produce defibrillation this should now be attempted with an electrical defibrillator. This instrument should be available in every theatre unit. Electrical defibrillation is effective because a shock of 1-3 amps for 0·1 seconds with a source of supply of 110 volts renders all muscle fibres of the heart refractory; irregular contraction thereupon ceases, standstill occurs and resumption of activity is followed by normal rhythm. Standstill may persist and this can then be treated as described above. If the shock is ineffective it is repeated, and a series of 5-6 shocks may be given rapidly. If still ineffective, 10 c.c. of 1% procaine should be injected into the right or left ventricle, massage continued and the shock repeated. Procaine undoubtedly aids defibrillation by making the myocardium less irritable, but there are some who feel that its depressant effect on the myocardium makes resuscitation from the ensuing standstill more difficult.[3] This, however, is not generally accepted, and it appears on balance that procaine has a definite place both in prophylaxis and in the treatment of ventricular fibrillation.

Adrenalin is the drug of choice in cases of standstill, but initially it should be avoided in ventricular fibrillation because it may make an anoxic myocardium more irritable. However, where other methods have failed, adrenalin by increasing the tonus of the fibrillating myocardium will convert a feeble fibrillation to a coarse fibrillation, which may then respond to massage. Calcium chloride may be used in a similar manner.[7]

It is sometimes noticed that, with the first attempts at respiration after the heart beat has been restored, asystole may again occur. This is probably due to

restoration of the activity of the medullary centres, resulting in a sudden burst of vagal activity which causes arrest. Procaine and atropine will protect against this complication.[6]

If arrest has followed haemorrhage, blood volume must be restored either through a peripheral transfusion or by means of an intra-aortic drip, depending on the need. It is useful during resuscitation to compress and occlude the aorta digitally against the vertebral column distally to the origin of the left subclavian, and if it is practicable a clamp may be applied at this level. Aortic occlusion results in increased tension and better circulation to the coronaries and the brain, and is useful in quickly re-establishing a more efficient cardiac action.[11] Compression should never be prolonged for more than 5-8 minutes for fear of damage to the cord, and after the clamp is removed the deterioration which may occur with re-opening of the splanchnic vascular bed must be watched for and treated.

The Defibrilator

The mode of action of this instrument has already been briefly discussed; but there are certain practical points which must be mentioned. Inadequate contact of the electrodes with the surface of the heart may result in an electric burn. This can be avoided by covering the metal electrodes with a glove of cloth which has been soaked in saline. It is theoretically possible for the operator to receive an electric shock while using the defibrillator, and therefore it is important for the electrode handles to be insulated and probably wise for the operator to wear two pairs of gloves. Contact with the patient's body and the metal operating table should be avoided by the surgeon, the assistants and the anaesthetist while the instrument is being used. Heat generated in the heart by frequent attempts at defibrillation may result in bubbles of gas entering the coronary circulation[7] and this may be mistaken for air embolism from an intravenous drip.

SUMMARY

A programme for the management of cases of cardiac arrest during operative procedures has been outlined.

It is stressed that a preconceived plan of action is necessary and that the surgical team and theatre staff must have knowledge of what is required in the emergency so that treatment can be expeditious. Preparedness in an X-ray department during major diagnostic work is as important as that in the theatre. Only 3-4 minutes are available in this emergency in which to restore the circulation if a life normal in intellect is to be saved.

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MILIARY TUBERCULOSIS AND PREGNANCY

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The modifying influence of pregnancy on the course of pulmonary tuberculosis is well documented. It is less well recognized that in certain instances pregnancy may determine the course of tuberculous infection.

Miliary tuberculosis, or acute blood-spread tuberculosis, usually occurs in association with a primary infection, but haematogenous dissemination may occur from any tuberculous focus in the body if a vessel is involved.

It is postulated that dissemination from a focus in the female genital tract is favoured by the increased vascularity of the genital organs during pregnancy, and by the local trauma associated with implantation of the ovum and with parturition. Similar views are expressed by Lundström[1] and by Turner[2]. None the less, the association of pregnancy with miliary tuberculosis is rare.

In 1947 Lundström[1] reviewed the literature, as far back as the turn of the century, on miliary tuberculosis and pregnancy. He summarised: 'We have record of 72 cases of miliary tuberculosis in association with pregnancy where in the majority of cases the disease developed or manifested itself in conjunction with abortion or childbirth. In 22 of these cases the focus of origin was certainly the genitalia, in 3 or 4 of the other cases possibly the genitalia, while in most of the remaining cases it was an extragenital focus, usually the lungs'. He added 2 cases of his own, in one of which the focus of origin was certainly the genitalia and, in the other, probably the genitalia.

Turner,[2] reviewing a series of cases of tuberculosis and pregnancy, states that of 78 cases of tuberculosis diagnosed during pregnancy, 7 were miliary tuberculosis, but gives no details.

In addition to these series, 5 cases are reported in detail in the literature—2 by Russel *et al.*[3], and one each by Spencer *et al.*[4], Harris and Trenchard[5], and Moore[6]. In two of these the focus of origin was certainly genital.

The records of this tuberculosis hospital over the last

4 years reveal 13 cases of miliary tuberculosis in Bantu females of child-bearing age. Of these, one was single, aged 20 and nulliparous, another was parous but details are not known, and a third had her last child 15 years before admission. In 1 case (case 1) miliary tuberculosis was diagnosed during pregnancy, in 5 cases (cases 2-6) it was diagnosed shortly after delivery or abortion, and

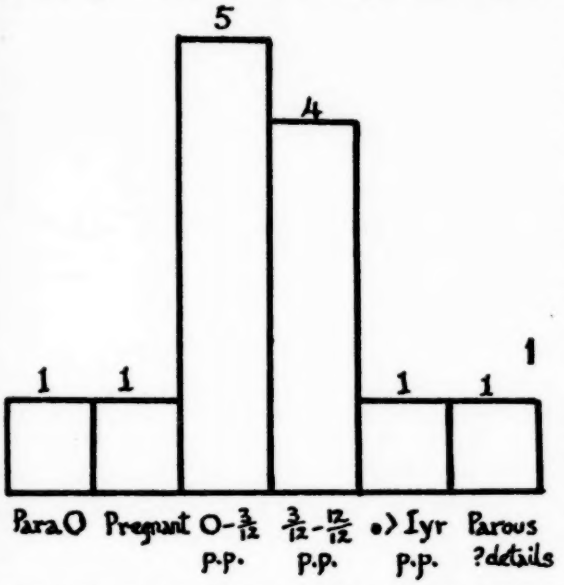

Fig. 1. Thirteen cases of miliary tuberculosis in Bantu females of child-bearing age.

in 4 cases (cases 7-10) the interval between delivery or abortion and the diagnosis of miliary tuberculosis was less than 1 year. This is in contrast (see Fig. 1) to the distribution in relation to pregnancy and delivery of 50 consecutive admissions of Bantu females of child-bearing age suffering from all forms of tuberculosis (Fig. 2). It is thus not a chance finding that the majority of cases of miliary tuberculosis in this group are diagnosed during pregnancy or shortly after delivery.

CASE RECORDS

Case 1. A nurse-aide, J.H., joined the staff of this hospital on 1 March 1949, and at that time she had a positive tuberculin test. She married, and her first pregnancy in 1952 was uneventful. She became pregnant a second time, and at the 6th month, on 1 September, 1953, she had a threatened abortion. She returned to duty after 7 days. Routine chest X-rays were clear from the time of appointment until, on 2 November 1953, early miliary mottling was visible. She had a full-term delivery on 3 December, 1953, and developed tuberculous meningitis. A purulent vaginal discharge cleared fairly rapidly. The mother, though still in hospital, now has a normal cerebrospinal fluid and a virtually clear chest X-ray. The child, now aged 16 months, is well. It was treated on streptomycin and INH until the age of 6 months, at which time the tuberculin test was still negative.

Case 2. E.N., a para 9, was admitted on 9 July, 1952, with miliary tuberculosis, 2 days after delivery of a stillborn infant at the 7th month of pregnancy. No post-mortem examination was performed on the infant, and the mother left hospital 3 months later, against medical advice, and has not been heard of since.

Case 3. C.P. was delivered of her 4th infant on 28 July 1952. The pregnancy was full term and the baby well. She was treated for tuberculosis in another hospital during August 1952, and then left against medical advice. She was admitted to this hospital on 23 September 1952, stuporose, and died the next day. Post-mortem examination revealed generalized miliary tuberculosis and tuberculous meningitis. There was no obvious lesion in the genital tract.

Case 4. Z.K., a para 1, was admitted 12 days after delivery of a 4-lb infant. The chest X-ray showed miliary mottling. Acidfast bacilli were present in the lochia, and cultural examination of the lochia was positive for *M. tuberculosis*. A week after admission the patient developed a typical tuberculous abdomen, and 2 weeks later a tuberculous meningitis. She is still in hospital, seriously ill. The child died at the age of 3 weeks, and post-mortem examination revealed enlarged perihepatic nodes and miliary tuberculosis.

Case 5. S.N. joined the staff of this hospital as a nurse-aide on 1 March 1948, and at that time had a positive tuberculin test. She later married but continued nursing. A salpingogram was taken in September 1953 on accuont of infertility. She became pregnant (L.M.P.) in December 1953 and had a threatened abortion on 6 February 1954. On 25 March 1954, while on her way to work, she again had a vaginal haemorrhage, and aborted that day. Miliary tuberculosis and tuberculous meningitis were diagnosed on 2 April 1954. The lochia was slow to clear. She responded well to treatment, and the chest X-ray and cerebrospinal fluid were virtually normal when she absconded from hospital on 2 March 1955.

Case 6. V.Z., a para 3, was admitted on 28 July 1954, 2 months after delivery. She had miliary tuberculosis and tuberculous meningitis, and lochia was still present. She is still in hospital, the chest X-ray is virtually clear, and the CSF findings are beginning to return to normal. The child at the age of 2 months had a negative tuberculin test, but at the age of 3 months had a primary visible on chest X-ray and the tuberculin test had converted. It was treated with streptomycin and INH, but died at the age of 8 months of gastro-enteritis.

Case 7. A.S., a para 3, was admitted on 13 November 1951, 5 months after an abortion at 5 months. She had not felt well since delivery. She had a well-defined miliary picture on chest X-ray examination. She left hospital against medical advice in

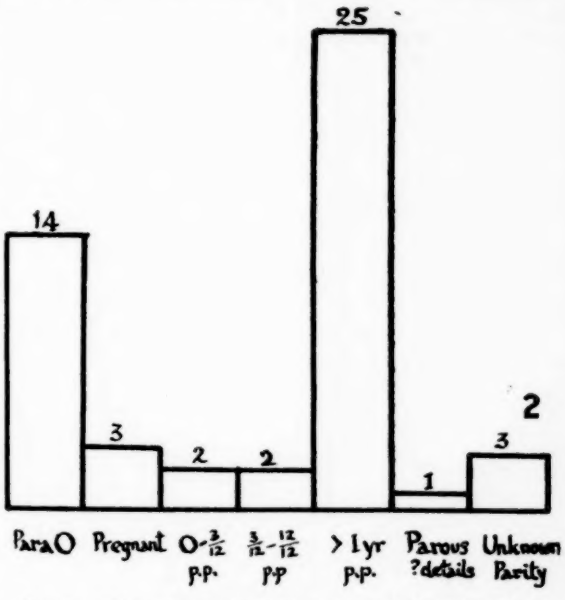

Fig. 2. Fifty consecutive admissions of Bantu females of child-bearing age. All forms of tuberculosis.

July 1952. When seen in July 1953 she was clinically well and the chest X-ray appeared clear.

Case 8. A para 3, was admitted on 28 November 1953, 8 months after delivery. She had miliary tuberculosis, tuberculous meningitis, abdominal and adnexal tuberculosis. This case is reported fully by Swart[7]. The child died at the age of 3 months, but the cause of death is not known.

Case 9. E.J., a para 2, was admitted on 28 October 1954, 8 months after delivery, with miliary tuberculosis. In January 1955 she developed a tuberculous meningitis, and though still in hospital is doing well. The child died at the age of 9 months of gastro-enteritis, and shortly before death gave a negative tuberculin reaction.

Case 10. J.G., a para 1, was admitted on 24 December 1952, 10 months after delivery. She gave a history of a brownish vaginal discharge since delivery. She had miliary and abdominal tuberculosis. She responded well to treatment and was discharged from hospital in February 1954. The child was well at the time of the mother's admission to hospital, but no further information is available.

Case 11. This case was not one of miliary tuberculosis, but of tuberculous meningitis. A.M. joined the staff of this hospital as a nurse-aide on 1 June 1949. Her tuberculin reaction was positive. Chest X-rays were clear, the last one being taken in February 1950. In May 1950 she was screened and the chest was reported as clear. She left the staff on 31 May 1950, 8 months pregnant. On 13 June 1950 she had several fits. She was delivered the next day and was admitted to another hospital in coma. She died on 15 June 1950 and post-mortem examination showed tuberculous meningitis and calcified and caseous nodes in the chest. The child was either stillborn or died shortly after delivery.

DISCUSSION

Genital tuberculosis is probably present more frequently than it is diagnosed in cases of extensive pulmonary tuberculosis. Although it is diagnosed most frequently in its milder forms in patients complaining of infertility, women with proved genital tuberculosis have subsequently become pregnant (Sutherland[8]). It seems reasonable to suppose that a genital focus, just as a pulmonary focus, may remain latent for many years, and that pregnancy may stir such a focus into activity, particularly when parturition causes local trauma and gives ready access to the blood stream.

Absolute evidence of genital tuberculosis is present in case 4, and presumptive evidence in cases 8 and 10. There is possible evidence for a genital focus in case 5 who complained of infertility, and in cases 1, 5 and 6 who had persistent or purulent lochia. Only case 11 had positive evidence of an extragenital focus, the lungs. It may be argued that in some of these cases primary infection may have taken place during the pregnancy in question, and that the miliary disease and the genital focus, if any, originated from the primary focus in the lungs. In cases 1 and 6, however, it is known that the primary infection must have taken place many years before as they had positive tuberculin reactions 5 and 6 years before the pregnancies in question. Case 11, although she had a positive tuberculin reaction a year before she developed tuberculous meningitis, had pulmonary tuberculosis of the primary type. It is suggested that, even should primary tuberculous infection take place during pregnancy, the fact of the pregnancy may determine the localization of tuberculous infection in the genital organs, and subsequent spread may then take place at the time of parturition.

Of the 11 cases cited here, 2 pregnancies ended in abortion, and one in premature labour at 7 months with a stillbirth. The remaining cases were full term or nearly so. Of these, one was a stillbirth, in 4 the infant died during the first year of life, in one the fate of the infant is unknown but it was known to be alive at the age of 10 months, and in another the fate of the infant is also unknown. Only one baby is known to be alive at the end of the first year. The maternal outlook is more cheerful. Two mothers have died. Three left hospital against medical advice and one of these was well a year later. Two were discharged from hospital alive and well, and 4 are still in hospital on treatment. Three of these are doing well, and the 4th has been treated for about 6 weeks only, so that it is too soon to assess this case. This information is summarized in Table I.

TABLE I

Case No.	*Type of Disease*					*Time of Diagnosis*		*Duration of Pregnancy*	*Mother*				*Baby*	
	Miliary	*Meningitis*	*Abdominal*	*Genital*	*Pulmonary*	*Parity*	*Time Postpartum*		*Dead*	*Discharged*	*Left A.M.A.*	*In Hospital*	*Dead—Age at Death*	*Alive—Age Last Follow-up*
1	+	+	+	?		2	*	FT				+		16 m
2	+					9	2 d	7 m			+		SB	
3	+	+				4	1 w	FT	+					Birth
4	+	+	+	+		1	2 w	? (4 lb)				+	3/52	
5	+	+		?		1	1 w	5 m			+		NV	
6	+	+		?		3	2 m	FT				+	8/12	
7	+					3	5 m	3 m			+		NV	
8	+	+	+	+		3	8 m	FT		+			3/12	
9	+	+				2	8 m	FT				+	9/12	
10	+		+	+		1	10 m	FT		+				10 m
11	+				+	1	1 d	8 m	+				SB	

* Diagnosed at 8 months of pregnancy. d=days, w=weeks, m=months. FT=full term. NV=non viable. SB=stillborn.

In a race where tuberculous morbidity is high we should look for cases of tuberculosis in antenatal clinics, and during the post-partum period in the maternity units of both hospital and district services, and we should look more diligently for cases of congenital tuberculosis.

SUMMARY

The literature on miliary tuberculosis diagnosed during pregnancy or in the post-partum period is reviewed. Ten cases of miliary tuberculosis and one of tuberculous meningitis developing during pregnancy or in relation to delivery or abortion are described. The possible pathogenesis of these cases is discussed, and the suggestion is put forward that pregnancy and parturition favour haemotogenous dissemination from latent foci of genital tuberculosis.

I wish to thank Dr. B. A. Dormer, Medical Superintendent, for permission to publish this paper.

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THE EXCRETION OF VIRUS DURING CONVALESCENCE FROM POLIOMYELITIS

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The group of viruses causing poliomyelitis was first divided into 3 basic immunological groups by Bodian, Morgan and Howe[1] in 1949, and this classification has served to distinguish the great majority of strains isolated since that time. The 3 types do not confer immunity against each other, and it is probable that acquaintance with all of them is necessary before a person can be considered immune to poliomyelitis. Infection with these viruses may, however, occur without any signs being manifested. The proportion of clinical cases to inapparent infections is small, and may be as low as 1 to 175 for infants under one year of age,[2] rising in the higher age-groups of children. Strains of virus within each type vary in virulence, and the incidence of frank disease will be related to the virulence of the virus predominant at a given time.

It is now generally accepted that the stools of persons who have contracted either inapparent or clinical infections with the viruses of poliomyelitis constitute the most common source of spread. It is probable that the primary site of viral increase is usually the pharynx, and in a proportion of cases the agent may be detected there a few days before illness occurs, persisting for several days after the onset of central nervous symptoms.[3, 4] During this period it makes its appearance in the stool, where it continues for a variable length of time. Virus has been isolated from the stool of a patient 19 days before onset of paralysis,[5] but it is not known whether the virus recovered then was of the same type as that causing the paralysis; and since in this case virus was also recovered from the throat at the time of illness it is possible that two independent viruses were involved. The incubation period after exposure may be as long as 3 weeks, but it is unlikely that the prodromal phase of faecal excretion is usually so long. The period of excretion following the onset of symptoms has been found by one group of investigators[6] to be up to 17 weeks and, although it is not certain whether this represented continuous passage of the same virus, it is probable that this was so, since Koprowski[7] has recovered the homologous virus from the stool of a volunteer fed 120 days previously with attenuated poliomyelitis virus. The problems associated with this fact are far-reaching and difficult of solution.

At the time when a case of poliomyelitis is detected, the virus is usually well distributed within the circle of family contacts, where approximately 80% of children and 50% of adults may become infected.[8] The extent of infection among contacts will be determined by the intimacy of association with the patient and with each other, but the risk of frank disease will be governed by the virulence of the strain and the immunological status of each individual. It has been found in animal experiments[9] that a relatively low level of circulating antibody is sufficient to protect against paralysis after challenge with living virus; but the presence of circulating antibody against a poliomyelitis virus does not necessarily prevent subsequent alimentary infection with the same type of virus.[10] Knowledge of the site of formation of antibody present in the intestine is incomplete; and there is some evidence to suggest that there may be a dissociation between the formation of intestinal and of humoral antibodies.[11]

The spread of virus is more extensive within the family circle than in the wider field of casual contacts, but a group such as a nursery school may present highly favourable conditions for viral dissemination.[12] Within the community at large the distribution of virus may be established well before the first case is reported; Rhodes *et al.*[13] having found virus in the sewage from a residential

area 5 weeks before the appearance of a clinical case. In view of the recovery of virus from the sewage of households other than those under strict quarantine in a town, Goffe and Parfitt[14] in a recent paper conclude that quarantine is not effective in preventing the spread of infection. While it may be agreed that quarantine of family or isolation of patient does not effectively prevent the spread of virus, nevertheless either could to some extent modify the distribution, and may be justified on this ground.

In Johannesburg poliomyelitis patients are transferred to an isolation hospital for at least 21 days, and close contacts are usually confined to their houses for a similiar period, although there is no legal restriction on their free movement. It is known, however, that nearly 50% of infected persons may continue to excrete virus for 3 weeks;[4] and there is no satisfactory reason for assuming the patient or his contacts to be free from infection after an arbitrary period of 21 days. Yet since excretion may continue in a small proportion of cases for 12 to 17 weeks it is difficult to contemplate successful isolation of all infected persons for so long a time.

The introduction by Robbins, Weller and Enders[15] of a roller-tube tissue-culture method for the propagation of poliomyelitis viruses has led to a greatly improved technique for the recognition of virus in the stool, yet no laboratory is equipped to deal with isolations from all cases and contacts during a large epidemic, even if it were desirable to do so for the purpose of isolating all excretors. The solution must obviously lie elsewhere. The most that can be done by quarantine or isolation is to attempt to check completely indiscriminate spread of virus, and to avoid factors predisposing to paralysis, such as fatigue, which can more readily be controlled when children known to have been exposed to infection are kept at home during a possible incubation period of 3 weeks.

PRESENT STUDY

The present study serves to confirm known facts about the excretion of virus, and to stress the need for a reconsideration of the value of hospital isolation. Fifteen patients were selected at random from those admitted to hospital during January and February 1955 with abnormal cerebrospinal fluid findings and a diagnosis of poliomyelitis. Two sets of stools from each patient were examined; most of the first specimens were taken within a week of admission to hospital, and the second specimens were taken after periods ranging from 22 to 46 days after the onset of symptoms. It is the experience of this laboratory that intermittent excretion of virus occurs, and that the pooling of 2 stools passed within a day or two of each other increases the number of positive isolations. Accordingly, in this investigation equal volumes of paired stools were pooled for most of the isolation attempts, and in the results given the stated period after onset at which the specimen was taken is that of the earlier stool of the pair.

Materials and Methods

Roller-tube monolayer cultures of renal epithelium from the vervet monkey *Cercopithecus aethiops pygerythrus*, prepared by the method of Youngner,[16] were used for the isolation and identification of virus. The nutrient fluid contained 94·5% Hanks' balanced salt-solution, 5·0% horse serum, and 0·5% lactalbumen hydrolysate, with the addition of 100 units of penicillin and 100 micrograms of streptomycin per millilitre.

Stools were stored at —20°C until tested, when suspensions were made to a concentration of approximately 20% in Hanks' solution containing 2% horse serum, and 750 units of penicillin and 750 micrograms of streptomycin per millilitre. These were centrifuged in an angle-head at 10°C for 30 minutes at a speed of 3,000 revolutions per minute. Of the supernatant fluid 0·4 ml. was introduced into each of 3 roller tubes, which were then incubated at 36°C for periods up to 14 days. On the appearance of cellular destruction, sub-inoculation of 0·1 ml. of harvested fluid was carried out in roller tubes. The identification of cytopathic agents was performed by the inoculation of roller tubes with mixtures of virus and hyper-immune sera produced in monkeys against each of the 3 recognized types of poliomyelitis virus; inhibition of cytopathic activity by one serum but not by the other two indicating the type to which the virus strain belonged.

Results

Table I summarizes the findings. Twelve of the patients were paralytic, and of these 10 yielded virus from the stool. Three patients were non-paralytic, and all yielded virus. Of 12 patients found to be excreting poliomyelitis virus at the first examination, 5 (41·6%) continued to pass the same virus for periods ranging from 25 to 39 days after onset of illness. The stool of patient 5 (Table I)

TABLE I. ISOLATIONS FROM ACUTE-PHASE AND CONVALESCENT-PHASE STOOLS

Patient	*Clinical Findings*	*First Stools (day after onset)*	*Result*	*Second Stools (day after onset)*	*Result*
1	Paralytic	6	Type 1	33	Negative
2	Paralytic	11	Type 1	31	Type 1
3	Non-paralytic	16	Type 3	33	Negative
4	Paralytic	6	Type 3	38	Type 3
5	Paralytic	11	Unidentified non-polio virus	46	Negative
6	Paralytic	4	Type 1	39	Type 1
7	Paralytic	6	Negative	43	Negative
8	Paralytic	8	Negative	32	Negative
9	Paralytic	4	Type 1	25	Type 1
10	Paralytic	8	Type 2	30	Type 1
11	Paralytic	5	Type 1	22	Negative
12	Paralytic	7	Type 1	27	Negative
13	Paralytic	14	Type 3	31	Negative
14	Non-paralytic	11	Type 1	27	Negative
15	Non-paralytic	9	Type 3	25	Type 3

contained a virus which gave an atypical pattern of growth in tissue culture, and which was not neutralized by antisera against poliomyelitis viruses. Both the original stool suspension and the tissue-culture fluid containing this virus failed to produce lesions when inoculated into suckling mice, indicating that it does not fall within the group of Coxsackie viruses. Its relation-

ship to the paralysis of patient 5, however, remains uncertain.

In this epidemic Type-1 predominated but, during the 2 months under consideration, a fair proportion of patients with Type-3 virus were admitted from the Johannesburg area. Patient 10 was transferred from a town 160 miles distant from Johannesburg, and was the only patient suffering from Type-2 virus at this time. She was placed in a ward in the company of patients 2, 9 and 11, all of whom were excreting Type-1 virus. In spite of hospital precautions against cross-infection, patient 10 converted from Type 2 to Type 1 before she left hospital. After the pooled specimens had shown this result, the individual stools from this patient were retested. Type-2 virus was isolated from each of the earlier specimens, and Type 1 from each of the later stools.

DISCUSSION

Since it has been shown that a patient may be returned to his social environment excreting either the virus which had already infected other persons or a virus of a different type, it must be asked whether the retention in hospital beyond the period of fever of a non-paralytic or only mildly paralytic case can be justified.

Observation of a 21-day isolation might reduce the number of excretors discharged from hospital by approximately one half: a procedure perhaps not without merit. If, alternatively, it were possible to employ a drug which could destroy virus in the intestine, this would prevent not only the passage of virus from known excretors, but might block the acquisition of infection if the community at large were treated prophylactically, and if resistant strains did not develop. Research into this aspect has been undertaken by a number of laboratories, and the screening of many substances for antiviral activity continues. Ward and his co-workers[17] reported in 1953 that a fall in the amount of virus excreted appeared to follow treatment with an organic mercurial compound; but no substance completely effective and free from toxicity has yet been found.

If the spread of virus cannot be significantly checked by means of drugs or restrictive measures, no alternative to the immunization of the population at large appears to exist at present. There is not yet sufficient evidence that oral administration of attenuated living strains of all three types of virus can be accomplished without danger of reversion to virulence when the virus has undergone a number of passages from person to person, although it is hoped that strains with a very brief phase in the intestine may be found. It is, however, possible that a safe parenteral route, such as intradermal inoculation, may be found for living virus; and this might obviate the uncontrolled distribution of virus. The inactivated-virus type of vaccine has recently undergone much scrutiny and criticism; but it is probable that it will provide a degree of protection sufficient to withstand the impact of re-infection with free virus, which in turn will serve to stimulate a still higher level of antibody.

The absence of an intermediate vector, the intimate relationship of virus to host cells, and the intestinal site of multiplication of poliomyelitis virus, have combined to make the problem of its present control one of immunity rather than of avoidance of infection.

SUMMARY

1. The faecal excretion of poliomyelitis virus, which may be prolonged up to 120 days, is discussed; and the limitations of the isolation of patients are considered.

2. Of 13 patients excreting virus in stools taken during the acute phase of illness, 5 were found to be passing the same types of virus at least 25 days after the onset of symptoms. In addition, one patient converted from passage of Type-2 virus to Type-1 virus while in hospital.

3. Methods of control of poliomyelitis are discussed.

The technical assistance of Mrs. N. Beattie and Mrs. E. Schliessler is gratefully acknowledged. We wish to thank Dr. J. W. Scott-Millar, Medical Officer of Health for Johannesburg, for his courtesy in allowing us to investigate these cases; and we are indebted to Dr. A. L. Jackson, Physician-in-Charge of the Johannesburg Fever Hospital, for his permission to consult records and for arranging the collection of specimens.

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UNION DEPARTMENT OF HEALTH BULLETIN

Union Department of Health Bulletin. Report for the 7 days ended 27 October 1955.

Plague, Smallpox, Typhus Fever: Nil.

Epidemic Diseases in other Countries.

Plague: Nil.

Cholera in Calcutta (India).

Smallpox in Herat, Kandahar (Afghanistan); Rangoon (Burma); Phnom-Penh (Cambodia); Ahmedabad, Bombay (India); Dacca (Pakistan); Saigon-Cholon (Viêt-Nam).

Typhus Fever: Nil.

BLADDER DRAINAGE

PERINEAL URETHROSTOMY IN MALES

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The patient with retention of urine most often requires immediate relief by drainage of the bladder. If the clinical circumstances permit, surgical removal of the obstruction by a single operation at an early stage is preferred. Such a course may be contra-indicated by the patient's poor general condition, by failing renal function, in congenital obstructions in young children, and by several other general and local factors, when the best interests of the patient will be served by temporary or permanent drainage of the bladder. The decision for such drainage having been made, there is a choice between urethral catheterization, suprapubic cystostomy and perineal urethrostomy.

The purpose of this paper is to make a plea for perineal urethrostomy as a method of drainage, and, by the record of a few case histories, to illustrate its application. I propose to discuss each method and to give reasons why I prefer perineal urethrostomy in most cases requiring protracted drainage of the obstructed bladder.

Urethral Catheterization

When the period of drainage is of limited duration and the urethra is healthy and of adequate size, then the use of an indwelling catheter or regularly repeated catheterization at 8-12 hourly periods is preferred. Urethral and urinary infection can usually be satisfactorily minimized by judicious chemotherapeutic and antibiotic therapy and by using a soft rubber catheter of small size.

The continued use of a catheter for more than a couple of weeks commonly provokes a troublesome urethritis and cystitis, which is frequently further complicated by epididymo-orchitis. In conditions like tabes, paraplegia and hemiplegia, where urethral sensation is absent or reduced, an indwelling catheter not infrequently sloughs completely through the urethra at the peno-scrotal junction. Apart from these hazards, mention must be also made of the considerable discomfort an indwelling catheter inflicts on the patient. This is particularly important in elderly men who because of senile cerebral changes are uncooperative and tend to meddle with the offending catheter continually. The use of a urethral catheter is often precluded by the presence of a urethral stricture and is generally impossible in young boys. In such instances the urethra is too narrow to permit a catheter of sufficient size for adequate drainage.

Suprapubic Cystostomy

This is a sound surgical procedure, which has stood the test of time and has saved the lives of many patients. It is a simple manoeuvre, expeditiously performed under local anaesthesia if so needed. When extravasation of urine from the bladder or urethra is diagnosed, as in cases of fractured pelvis, suprapubic cystostomy is unquestionably indicated, but chiefly for the reason that it provides simultaneous drainage of the perivesical space. When the bladder drainage also has to provide exit for bleeding and large clots of blood, a tube of adequate size is feasible only through a cystostomy opening.

In the great number of other conditions demanding protracted drainage perineal urethrostomy is as good as suprapubic cystostomy and has fewer disadvantages. It is an even simpler operation, causes less post-operative pain, and has the additional advantage of providing dependant drainage, even when the bladder is dilated, thin walled and atonic. More often than not the cystostomy opening is not or does not remain watertight. In non-cooperative patients (the young and the confused old) there is frequently interference by the patient with the wound and the tube and considerable nursing care may be necessary. Some patients are considerably put out by having a 'tube in the stomach', and in long-term drainage they find it a considerable hindrance to movement, bathing and even sleeping. The de Pezzer and Malecot catheters usually employed with cystostomy are quite easily removed and replaced, but it is usually necessary for this to be done by a doctor. Changing of these tubes is never pleasant for the patient and may be quite painful.

Perineal Urethrostomy

This is a method of drainage which is not commonly employed, probably because its advantages are not appreciated. It is particularly valuable in young males and debilitated old men who are bedridden. In comparison with suprapubic cystostomy it is a lesser surgical operation with far less post-operative discomfort. The wound is small and cannot disrupt. The catheter emerges at a site not readily accessible to the prowling hand of the difficult patient. Even if this small wound should become infected, it has such excellent drainage that complications are negligible. Since a natural channel is employed leakage alongside the catheter is rare. Drainage of the bladder is downwards and is from the lowest point of the bladder whether the patient is ambulant or bedridden. In spite of the fact that the catheter lies in the posterior urethra the incidence of epididymitis is rare because of good drainage alongside the catheter. Perineal urethrostomy opens the urethra where the lumen is at its widest and consequently allows the passage of the largest possible tube for the particular patient. Once the urethrostomy is established, the changing of catheters is a duty readily and safely relegated to the nursing staff.

Many of the cases who require bladder drainage are

ultimately treated by transurethral resection of the prostate. This is conveniently performed *via* the urethrostomy opening; it allows the use of a much larger instrument than the anterior urethra. A transurethral resection done in this way is a lesser procedure for the patient and in my experience easier for the surgeon.

The possibility of a fistula or stricture at the site of the urethrostomy must be considered. The length of time that the perineal fistula takes to heal depends largely on the period the urethrostomy was employed for drainage. After many weeks the fistula develops fibrous walls and may become epithelized, and is then slow to heal completely. Hot sitz-baths and the periodic passage of a full-sized urethral sound usually hastens its closure. It is my experience that a urethrostomy opening closes as readily as a cystostomy opening and is easier to repair surgically in the few cases when this becomes necessary. Urethral stricture after urethrostomy is uncommon. Should a stricture occur, it will be in the bulb of the urethra at a site most amenable to treatment by dilatation.

The Operation

The technique of perineal urethrostomy is easily mastered and the operation can be done under caudal anaesthesia if the patient is not fit enough for the low spinal or general anaesthesia. An assistant is essential and the position of the patient on the operating table is important. It should be a rather exaggerated lithotomy position, with the thighs well flexed at the hip joints. After the cleansing of the external genitalia and perineum, this area is draped in the usual way. A metal urethral sound of medium size is passed into the urethra so that the tip enters the posterior urethra and the curve presents in the perineum. While the assistant maintains the sound in this position, the surgeon grasps the curve of the sound firmly between the thumb and forefinger of the left hand about midway between the base of the scrotum and the anus. An incision of about an inch is then made directly onto the sound so as to expose it clearly. If the grasping pressure on the sound is maintained bleeding is minimal. The edges of the urethra are then caught neatly with tissue forceps, the sound is withdrawn, and a suitable catheter is immediately introduced between the tissue forceps with a slight posterior inclination so as to enter the posterior urethra and the bladder. If a self-retaining bag catheter (Foley) is used, the bag is then inflated to prevent the catheter slipping out while bleeding is attended to. Bleeding is always profuse because of the incision through the cavernous tissue around the urethra. It is efficiently and rapidly controlled by a continuous suture of No. 1 plain catgut which approximates the bulbo-cavernosus muscle and corpus spongiosum urethra on the distal side of the incision. The catheter should emerge from the end of the wound nearest the anus. It is not necessary, and probably better, not to include the wall of the urethra in the suture. Skin and fat are loosely approximated by a single skin-stitch and it is better to leave the wound slightly open for free drainage. It is advisable always to secure the catheter to the skin with a suitable stitch even when the bag catheter is used, for the bag may break within the first few days. After 4 days a track has formed and immediate re-insertion of a new catheter presents no difficulty. Powdered sulphonamide on dry gauze makes a suitable dressing to the perineal wound, at the completion of the operation and afterwards. Wounds in the perineum are notorious for becoming moist and smelly, but nevertheless are famous for freedom from toxic reactions and eventual good healing. In the unusual event of the wound looking angry or being unduly purulent, hot sitz-baths are recommended if the patient is sufficiently ambulant; if not, then hot fomentations. Bladder wash-outs are ordered only if the urine is infected.

The catheter should be changed at intervals of 2-4 weeks, depending upon the amount of urinary salts deposited within the lumen. This is easily judged by rolling the catheter between the fingers, when the grating sensation of encrusted salts is readily appreciated. It occurs particularly when the urine is alkaline and infected, and can be counteracted by acidifying the urine or by giving frequent bladder wash-outs with a mildly acid solution like boracic acid or 0·25% solution of acetic acid. The prophylactic administration of sulphonamides or antibiotics is optional. Since perineal urethrostomy provides adequate and dependant drainage urinary antiseptics are not usually required. In the majority of older patients requiring bladder drainage there will eventually follow some sort of attack on the prostate and for this reason bilateral vas ligation is usually carried out at the same time as the perineal urethrostomy to preclude, as far as possible, the occurrence of epididymo-orchitis.

CASE RECORDS

The usefulness and applicability of perineal urethrostomy is illustrated in the following case histories:

Mr. A. de V., a European farmer aged 74, was seen in consultation in October 1953 and found to have an enlarged prostate, gross retention of urine and overflow incontinence. He declined treatment and went home. In June 1954 he was admitted to Conradie Hospital, Pinelands, because he could no longer be cared for at home. He was dehydrated and had lost weight, and the urine was infected. He leaked urine almost constantly and also had faecal incontinence. The blood urea was 145 mg.% and the P.S.P. renal function test was 5% in 2 hours. Perineal urethrostomy was performed under caudal anaesthesia supplemented by light general anaesthesia. At the same time the patient was cystoscoped and found to have a large enucleable prostate, a grossly trabeculated bladder and no diverticulum. He drained well but he was a difficult nursing problem; he refused food and fluids, frequently dirtied his bed, often tried to pull his catheter out, and was as uncooperative as possible. He would never have tolerated a urethral catheter and he would certainly have removed a suprapubic tube and contaminated the wound. Six weeks later his renal function had sufficiently recovered to permit a retropubic prostatectomy, from which he recovered and went home 3 weeks later with all the wounds healed. The perineal fistula was slow in closing because of the protracted pre-operative drainage.

This case is one of several that could be quoted. From my experience I favour perineal urethrostomy and drainage particularly in prostatic obstruction complicated by poor renal function. It permits early mobility, causes minimal post-operative pain, abdominal distension and infection and ensures excellent dependant drainage. It leaves the abdomen unscarred

for the subsequent prostatectomy and it does not preclude a perineal prostatectomy. It is important that the patient should first be cystoscoped or have a cystogram made to exclude diverticulum of the bladder. The presence of one or more diverticuli of the bladder, which do not empty spontaneously, is an absolute indication for diverticulectomy and suprapubic cystostomy if the patient's condition will allow. Any form of bladder drainage in the presence of a non-emptying diverticulum will be followed by gross urosepsis and a probable fatal outcome.

F., a male European aged 75, had a gross inoperable carcinoma of the stomach. He was thin, debilitated and frail. His urinary complaints had previously been minimal but after a laparotomy he developed acute retention. This is a common occurrence in elderly males who have moderate prostatic enlargement and who are precipitated to bed for such reasons as an operation, coronary thrombosis, fractured neck of femur and so on. In this case an indwelling urethral catheter had been used for 3 weeks and there was considerable urethritis and unilateral epididymitis. Perineal urethrostomy was performed under a short and light general anaesthesia and after 10 days the patient was discharged from hospital and cared for at home. Since the prognosis was hopeless the urethrostomy was to be permanent. He died 8 weeks later with generalized carcinomatosis. His bladder drainage was no problem and the catheter was regularly changed by a nursing sister.

P.D., a Coloured lad aged 10 *years*, was admitted to a children's orthopaedic home with paraplegia due to a tuberculous lesion involving the 11th and 12th dorsal vertebrae. He had bladder involvement in that he had retention with overflow incontinence. While the urine was uninfected and the renal tracts showed no damage, he was nursed on a frame and he dribbled urine into a bottle. The urine became infected and the infection controlled only so long as antibiotics were given. At this time, too, an orthopaedic consultant decided upon a spinal operation and wanted a dry bed. The desired treatment of the infected neurogenic bladder was by tidal drainage and perineal urethrostomy met everyone's requirements by allowing the easy passage of a No. F. 20 return-flow Foley catheter into the bladder. The boy's penile urethra would hardly have allowed an F. 12 catheter, and suprapubic cystostomy drainage would have precluded tidal drainage and hampered the turning of the patient from the supine to the prone. During his future treatment, when the neurological effect of the disease is stabilized, and if the bladder is still paralyzed, a transurethral resection of the bladder neck *via* the urethrostomy opening is planned. This presents no difficulty even in a young boy, for the urethra at this site will permit the passage of a small adult resectoscope.

Mr. R., a European male aged 35, was involved in a motor accident and sustained a fractured spine at the level of the 1st lumbar vertebra. He had immediate paraplegia and paralyzed bladder and rectum. An indwelling urethral catheter was employed for 6 weeks, at which time in spite of adequate chemotherapy he developed gross urethritis and oedema of the penis and an acute epididymo-orchitis. Perineal urethrostomy was performed and a suitable catheter was passed to allow tidal drainage of the bladder. Within 48 hours the urethritis and oedema of the penis had almost completely settled and the epididymo-orchitis had subsided considerably. Two weeks later a transurethral resection of the neck of the bladder and part of the prostate could easily be done *via* the urethrostomy opening. (The resection in these cases of paraplegia aims at reducing the normal resistance at the neck of the bladder so that the weakened detrusor muscle is able to effect emptying of the bladder.) The patient was discharged from hospital to lead a wheel-chair life at home. He empties his bladder *via* the urethra at regular intervals during the day and at night by forceful contraction and pressure of the abdominal muscles. This case illustrates the several advantages of perineal urethrostomy, including the beneficial effect on epididymitis.

THE LIMITED REGISTRATION OF PRACTITIONERS FROM HOLLAND : DIE BEPERKTE REGISTRASIE VAN MEDIESE PRAKTISYNS UIT HOLLAND

The expected new regulation has now been promulgated under which limited numbers of Netherlands nationals holding the Arts Examen qualification may be registered by the South African Medical and Dental Council and practise in the Union. It will be observed that the new regulation is general in its terms and that by the promulgation of additions to the list at the end of the regulation it may be applied to other countries than Holland. Official enquiries on the point have in fact been made by Belgium and West Germany.

The regulation (No. 1932 of 30 September 1955) is as follows:

AMENDMENT OF THE REGULATIONS REGARDING THE DEGREES, DIPLOMAS OR CERTIFICATES ENTITLING MEDICAL PRACTITIONERS AND DENTISTS TO REGISTRATION

His Excellency the Governor-General has been pleased, under the powers vested in him by section *twenty-two* read with subsection (1) of section *ninety-four* of the Medical, Dental and Pharmacy Act, 1928 (Act No. 13 of 1928), and after considering a recommendation of the South African Medical and Dental Council, to amend the regulations published under Government Notice No. 398 of 19 March 1937, as amended, as follows:

(1) By the addition after regulation (1) of the following new regulation (2):

"(2) Subject to the provisions of the Medical, Dental and Pharmacy Act, No. 13 of 1928, and the rules and regulations in force thereunder, any of the following degrees, diplomas or certificates shall entitle the holder thereof to registration as a medical practitioner; provided that—

Die verwagte nuwe regulasie is nou uitgevaardig, kragtens waarvan beperkte aantalle Nederlandse burgers wat die Arts Examenkwalifikasie besit deur die Suid-Afrikaanse Geneeskundige en Tandheelkundige Raad geregistreer mag word en in die Unie mag praktiseer. Ons let daarop dat die nuwe regulasie algemeen in sy bepalings is, en dat dit kragtens die promulgasie van byvoegings tot die lys aan die einde van die regulasie ook op ander lande behalwe Holland toegepas mag word. België en Wes-Duitsland het inderdaad reeds amptelike navrae in hierdie verband gedoen.

Die regulasie (nr. 1932 van 30 September 1955) lees as volg:

WYSIGING VAN DIE REGULASIES BETREFFENDE DIE GRADE, DIPLOMAS EN SERTIFIKATE WAT GENEESHERE EN TANDARTSE REG GEE OP REGISTRASIE

Dit het Sy Eksellensie die Goewerneur-generaal behaag om, kragtens die bevoegdheid hom verleen by artikel *twee-en-twintig* gelees met subartikel (1) van artikel *vier-en-negentig* van die Wet op Geneeshere, Tandartse en Aptekers, 1928 (Wet nr. 13 van 1928), en na oorweging van 'n aanbeveling van die Suid-Afrikaanse Geneeskundige en Tandheelkundige Raad, die regulasies afgekondig by Goewermentskennisgewing nr. 398 van 19 Maart 1937, soos gewysig, as volg te wysig:

(1) Deur na regulasie (1) die volgende nuwe regulasie (2) by te voeg:

„(2) Behoudens die bepalings van die Wet op Geneeshere, Tandartse en Aptekers, nr. 13 van 1928, en die reglemente ingevolge daarvan van krag, gee enigeen van die volgende grade, diplomas of sertifikate die houer daarvan die reg om as 'n geneesheer geregistreer te word; met dien verstande dat—

(*a*) no person shall be so registered unless the degrees, diplomas or certificates held singly or conjointly by him show that he has passed qualifying examinations in medicine, surgery and midwifery; and

(*b*) such degrees, diplomas or certificates shall only be recognised for registration if the course of study in professional subjects covered a period of at least five academic years and, in addition, the last three years of professional study for admission to the examination for such degree, diploma or certificate were taken at a University or medical school in the country or state in which the degree, diploma or certificate was granted; and

(*c*) the holder of such a degree, diploma or certificate furnishes proof to the satisfaction of the Council that he has, since obtaining the said degree, diploma or certificate, undergone training as an intern for a total period of at least twelve months in terms of regulations made under section *twenty-five* of the Act.

But this proviso shall not apply to the holder of any degree, diploma or certificate obtained prior to 1 November 1948; and

(*d*) the holder of such a degree, diploma or certificate furnishes proof to the satisfaction of the Council that he is a national of the country or state in which the degree, diploma or certificate was granted; and

(*e*) the holder of such degree, diploma or certificate furnishes proof to the satisfaction of the Council that—

(i) he is one of such specified number of holders as has been determined by resolution of the Council at its first ordinary meeting in each calendar year as being entitled to registration as a medical practitioner in terms of these regulations during the next succeeding calendar year; provided that in respect of the calendar year in which these regulations become operative such number shall be determined by the Council at its first ordinary meeting in that calendar year; and

(ii) he has been selected as one of such specified number in accordance with the procedure specified in paragraph (*f*) hereof; and

(*f*) the holder of such a degree, diploma or certificate furnishes proof to the satisfaction of the Council, under the hand of a person, in the country or state in which the degree, diploma or certificate was granted, carrying out similar functions to those carried out by the Minister of Health in the Union of South Africa in relation to the selection of any South African citizen holding degrees, diplomas or certificates granted after examination in the Union as one of a specified number of such holders entitled to registration as medical practitioners in that country or state, or under the hand of a person or persons duly authorised by such person, that he has been selected as one of the specified number of holders referred to in paragraph (*e*), in accordance with a procedure to be determined by such person, or a person or persons duly authorised by him, save that should such holder fail to obtain a permit to enter the Union of South Africa as a permanent resident, or for any other reason be unable to secure registration in the Union of South Africa, another holder of such degree, diploma or certificate may be selected in accordance with the specified procedure in his stead; provided that the total number selected for a particular calendar year shall not exceed the specified number referred to in paragraph (*e*); and provided further that any person selected in accordance with the paragraph for a particular calendar year and who fails to apply for registration in such calendar year, shall not be entitled to registration in any subsequent calendar year by virtue of his selection for such previous calendar year.

Country or State	*Qualification*
The Netherlands	Arts Examen".

(2) By re-numbering the present regulations (2), (3) and (4) as (3), (4) and (5) respectively.

(*a*) niemand aldus geregistreer kan word nie tensy die grade, diplomas of sertifikate wat hy hou, hetsy een of meer, bewys dat hy die kwalifiseerde eksamens in medisyne, heelkunde en verloskunde met goeie gevolg afgelê het; en

(*b*) sulke grade, diplomas of sertifikate alleen vir registrasie erken word indien die studiekursus in professionele vakke 'n tydperk van minstens vyf akademiese jare geduur het en boonop dat die laaste drie jaar van professionele studie vir toelating tot die eksamen vir sodanige graad, diploma of sertifikaat gevolg is op 'n universiteit of skool vir geneeskunde in die land of staat waarin die graad, diploma of sertifikaat toegeken is; en

(*c*) die houer van sodanige graad, diploma of sertifikaat, tot tevredenheid van die Raad bewys lewer dat hy, sedert die verkryging van genoemde graad, diploma of sertifikaat, opleiding gehad het as 'n intern vir 'n totale tydperk van minstens twaalf maande, soos bepaal in die regulasies opgestel ingevolge artikel *vyf-en-twintig* van die Wet.

Maar hierdie voorbehoudsbepaling is nie van toepassing op die houer van enige graad, diploma of sertifikaat wat voor 1 November 1948 verkry is nie; en

(*d*) die houer van sodanige graad, diploma of sertifikaat, tot tevredenheid van die Raad bewys lewer dat hy 'n burger is van die land of staat waarin die graad, diploma of sertifikaat toegeken is; en

(*e*) die houer van sodanige graad, diploma of sertifikaat, tot tevredenheid van die Raad bewys lewer dat—

(i) hy een is van sodanige bepaalde aantal houers, soos vasgestel deur 'n besluit van die Raad op sy eerste gewone vergadering in elke kalenderjaar, wat geregtig is op registrasie ingevolge hierdie regulasies as 'n geneesheer gedurende die daaropvolgende kalenderjaar; met dien verstande dat, met betrekking tot die kalenderjaar waarin hierdie regulasies in werking tree, sodanige aantal deur die Raad op sy eerste gewone vergadering in daardie kalenderjaar vasgestel word; en

(ii) hy as een van sodanige bepaalde aantal gekeur is ooreenkomstig die prosedure bepaal in paragraaf (*f*) hiervan; en

(*f*) die houer van sodanige graad, diploma of sertifikaat, tot tevredenheid van die Raad bewys lewer wat onderteken is deur 'n persoon in die land of staat waarin die graad, diploma of sertifikaat toegeken is, wat funksies verrig soortgelyk aan dié wat deur die Minister van Gesondheid in die Unie van Suid-Afrika verrig word in verband met die keuring van enige Suid-Afrikaanse burger wat in besit is van grade, diplomas of sertifikate toegeken nadat hy eksamens in die Unie afgelê het as een van 'n bepaalde aantal van sodanige houers wat geregtig is om as geneeshere geregistreer te word in daardie land of staat, of onderteken deur 'n persoon of persone behoorlik daartoe gemagtig deur sodanige persoon, dat hy gekeur is as een van die bepaalde aantal houers in paragraaf (*e*) genoem, ooreenkomstig 'n prosedure vasgestel deur sodanige persoon, of 'n persoon of persone behoorlik daartoe gemagtig deur hom behalwe dat ingeval sodanige houer in gebreke bly om 'n permit te verkry om die Unie van Suid-Afrika as 'n permanente inwoner binne te kom, of om enige ander rede nie in staat is om registrasie in die Unie van Suid-Afrika te verkry nie, 'n ander houer van sodanige graad, diploma of sertifikaat ooreenkomstig die bepaalde prosedure in sy plek gekies mag word; met dien verstande dat die totale aantal gekeur vir 'n besondere kalenderjaar nie die bepaalde aantal in paragraaf (*e*) genoem, mag oorskry nie; en met dien verstande verder dat enige persoon ooreenkomstig hierdie paragraaf vir 'n besondere kalenderjaar gekeur wat nalaat om binne sodanige kalenderjaar om registrasie aansoek te doen, nie in enige daaropvolgende kalenderjaar op registrasie geregtig is op grond van sy keuring vir sodanige vorige kalenderjaar nie.

Land of Staat	*Kwalifikasie*
Die Nederlande	Arts Examen".

(2) Deur die bestaande regulasies (2), (3) en (4) te hernommer as onderskeidelik (3), (4) en (5).

RESEARCH FORUM, UNIVERSITY OF CAPE TOWN

THROMBOCYTOPENIA AND PROTHROMBIN AND FACTOR-7 DEFICIENCY IN KWASHIORKOR

Abstract of Paper by C. Merskey, M.D., M.R.C.P. and J. D. L. Hansen, M.B., Ch.B., D.C.H., M.R.C.P.

Studies of coagulation function have been carried out in Cape Town on 58 babies with kwashiorkor. Purpura was found to be present in 9 cases. Platelet counts were found to be under 50,000 per c.mm. in 4 cases and under 100,000 in 5 more. Patients who were thrombocytopenic were not necessarily purpuric, and conversely patients with purpura were not always thrombocytopenic.

The prothrombin index on admission was almost invariably reduced. This defect in the prothrombin complex was mainly due to a deficiency of factor-7 though prothrombin itself was also reduced in some cases. In no case was a factor-5 deficiency found. There was gross impairment of plasma-thromboplastin generation and the defect was found to be in the serum fraction. This also proved to be due to a factor-7 deficiency. Anti-haemophilic globulin and Christmas factors were found to be normal. No inhibitors could be demonstrated.

A rapid return to normal of the prothrombin index and factor-7 occurred on skim-milk diet or on synthetic diets containing all the commonly occurring vitamins. In the absence of vitamins, the return of these factors to normal was delayed. It appeared probable that vitamin K was, in the main, responsible for the return to normal of the prothrombin complex.

All the patients studied had diarrhoea, and it was considered likely that this was an important contributory factor in the production of the prothrombin-complex deficiency.

NEW PREPARATIONS AND APPLIANCES : NUWE PREPARATE EN TOESTELLE

Scherag (Pty.), Ltd., announce their appointment as sole distributors in South Africa for Union Chimique Belge, of Brussels, whose products — *Movirene*, *Toclase* and *Navicalm* — are now available to the medical profession in South Africa. They supply the following details:

Movirene (diacetyl-pyrocatechol-3 : carboxylic acid) has a high anti-rheumatic activity being at least three times as active as sodium salicylate and possessing marked antipyretic actions and analgesic properties. Having extremely low toxicity and being rapidly eliminated, there is no definite contra-indication and Movirene can with advantage replace sodium salicylate in all its indications. Available in tablets each 25 mg.

Toclase (carbetopentane), is a specific inhibitor of the cough reflex centre. It is not narcotic but biological tests have shown that Toclase has an activity equal to 150% of codeine phosphate and an identical duration of effect. It is indicated for the suppression of unproductive cough, often damaging and harmful. It also facilitates the control of productive cough and terminates it as soon as its usefulness is over. Available in tablets 25 mg. and as a syrup containing 7·5 mg. per teaspoonful.

Navicalm, a new, original antihistamine, provides an effective remedy with a prolonged duration of action and without any side effects for those who suffer from air, sea and motion sickness. Available in tablets each 25 mg.

Daprisal: Smith Kline & French International Co., represented by M. & J. Pharmaceuticals (Pty.), Ltd., announce the introduction of Daprisal and provide the following details:

Increased Resistance: Daprisal provides a comprehensive attack against pain, in that it does not merely decrease pain itself, but also increases the patient's resistance to it, by providing: *Sedation* for the apprehension which makes every patient more aware of pain, and thus eliminates the concentrated uneasiness which contributes largely to the patient's discomfort and suffering. *Analgaesia* for the pain which lies at the root of the patient's suffering. *Optimism* and eradicating the depression, alone responsible for the feeling of general malaise and torpor.

Formula: Each tablet of Daprisal contains, Amylobarbitone 32 mg. (gr. ½), Dexedrine 5 mg., Acetyl-salicylic Acid 160 mg. (gr. 2½), Phenacetin 160 mg. (gr. 2½).

Indications: For the symptomatic relief of pain especially when attended by apprehension and depression. Typical indications are: Headache, particularly headache of psychogenic origin and sinusitis. Rheumatism and allied disorders. Rheumatoid arthritis. Functional dysmenorrhoea. Certain cases of migraine.

Dosage and Administration: 1 tablet every three hours as required. Daprisal should be used with caution in patients hypersensitive to acetylsalicylic acid—particularly asthmatics—to barbiturates, or to sympathomimetic compounds. Caution should also be exercised where there is severe impairment of hepatic function or in coronary or cadio-vascular disease.

Packaging: 'Daprisal' is available in containers of 25.

PASSING EVENTS : IN DIE VERBYGAAN

Dr. M. L. Freedman, O.B.E., Director of Medical Services, Bechuanaland Protectorate, who recently attended the Fifth Session of the Regional Committee for Africa of the World Health Organization held at Tananarive, Madagascar, as a member of the United Kingdom delegation, has been invited by the World Health Organization to attend the International Conference on Yaws Control at Enugu, Nigeria, and the Malaria Conference at Lagos.

* * *

The Medical Graduates Association of the University of the Witwatersrand, Johannesburg, is holding an Alumi Dinner in honour of the Classes of '27/'28 and their teachers, together with present members of Staff. The dinner will take place on Thursday, 17 November 1955 at the Auto Club, Killarney, Johannesburg. Cocktails commence at 6.30 p.m. Tickets £1 5s. (including drinks) Dress formal.

For reservations apply to the Secretary, Medical Graduates Association, Medical School, Johannesburg. Phone 44-7040.

* * *

At the annual general meeting of the South African Society of Anaesthetists, held on 16 October 1955, the following members were elected to the Council for the year 1955/56: Chairman, Dr. F. W. Roberts; Vice-Chairman, Dr. R. A. Moore Dyke; Secretary/Treasurer, Dr. F. J. Durham; Members, Drs. H. Bentel, H. Ginsberg, G. Hochschild, O. J. Verster; Area Representatives, Northern Transvaal, Dr. O. V. S. Kok; Southern Transvaal, Dr. C. Frost; Western Cape, Dr. C. Jones; Natal, Dr. H. Grant-Whyte; Eastern Province, Dr. R. A. Moore Dyke; Free State, Dr. B. Cockcroft; Immediate Past President, Dr. E. van Hoogstraten.

* * *

Dr. Mark Horwitz has resumed practice as a Specialist Physician in Cape Town.

* * *

Television in the Operating Theatre. The firm of Philips gave a demonstration of television of surgical operations at the General Hospital, Pretoria, during the South African Medical Congress, October 1955.

The camera was set up in the operating theatre to view the operation from over the surgeon's left shoulder by means of a telephoto lens, and members of Congress, who watched the opera-

tion in the darkened surgeons' room at the other end of the hospital, were able to follow the details with remarkable facility.

The advantage of television as part of the equipment of the operating theatre is that spectators can view operative procedures without crowding the theatre or embarrassing the surgeon.

* * *

New Dental Journal. The American Dental Association has announced a new monthly journal entitled 'Dental Abstracts', of which the first issue will appear in January 1956. It will contain abstracts of articles drawn from medical publications throughout the world, and periodicals of allied health professions will also be reviewed for articles of interest to dentists. The annual subscription price outside the US is $7.00, payable in advance in US currency to 'Dental Abstracts', American Dental Association, 222 East Superior Street, Chicago 11, Illinois, USA.

* * *

Dr. H. Grusin, M.B., B.Ch. (Rand), M.R.C.P. (Lond.), has resigned his post as Physician at Baragwanath Hospital and has commenced private practice as a Specialist Physician at 16 Moray House, Jeppe Street, Johannesburg.

* * *

A meeting of the Cape Sub-Group of the South African Society of Industrial Health, a Group of the Medical Association of South Africa, will take place at the New Somerset Hospital on Wednesday, 16 November at 8.15 p.m. Mr. A. Singer, M.Ch., Orth., will speak on the rehabilitation of orthopaedic patients, and will demonstrate cases.

* * *

Dr. N. Saks, of Johannesburg, has recently returned from a visit to England, where he attended the Congress in Neuroradiology held under the auspices of the National Hospital for Nervous Diseases, Queen's Square, London.

* * *

The Leukemia Society, Inc. (New York—formerly the Robert Roesler de Villiers Foundation Inc.) has made grants totalling $4,000 for research into (1) the biochemical characteristics of leukaemia, (2) human bone marrow in relation to leukaemia, (3) the transmissal of leukaemia in rats, and (4), at the Atomic Energy Research Establishment, Harwell, England, the effects of irradiation on leukaemia.

It is pointed out that in New York city leukaemia today is the fourth-highest in the list of diseases responsible for deaths in children.

* * *

Dr. S. C. J. van Niekerk, M.B., Ch.B., wat gedurende 1954 aan die Koning Eduard VIII-Hospitaal, Durban, en onlangs op Robertson werksaam was, praktiseer vanaf Oktober 1955 te Malmesbury, K.P. Sy adres is as volg: ‚Sonneskyn', Rainierstraat, Malmesbury. Telefoon 152.

BOOK REVIEWS : BOEKRESENSIES

BACKACHE IN WOMEN

Backache in Women. By E. Schleyer-Saunders, M.D., F.I.C.S. Pp. 80, with 6 illustrations. 7s. 6d. Bristol: John Wright & Sons Ltd. 1955.

Contents: 1. Introduction. 2. Gynaecological Backache. 3. Orthopaedic Backache. 4. Intervertebral Disc Lesions. 5. Rheumatic Backache. 6. Coccygodynia. 7. Backache Associated with Intestinal Disorders. 8. Backache Associated with Urological Conditions. 9. Psychoneurotic Backache. 10. General Rules in the Treatment of Backache. 11. Prophylaxis. 12. Conclusions. Bibliography. Index.

This book is written by a gynaecologist and its object is to present the problem of backache in a practical way. Both diagnosis and treatment are discussed.

The author has divided backache into three main groups, viz. (1) gynaecological, (2) orthopaedic and (3) rheumatic; and on the whole has succeeded in giving a concise and lucid account of this trying problem.

However, one would like to level some criticism at the section dealing with the gynaecological causes of backache. In the discussion of the retroverted uterus as a cause of backache no clear distinction seems to be made between a mobile and a fixed retroversion. The statement that 'dermoid cyst, dysgerminoma and granulosa-cell tumour may or may not cause backache' is meaningless. Most gynaecologists would hesitate to use even a small dose of radium (25 mg. for 12 hours) to bring relief to the young woman with endometriosis.

As Professor W. C. W. Nixon states in his foreword, backache in women is a common complaint which is often suffered in silence. This book should be useful to general practitioners in their management of an often distressing disability. E.M.S.

GLAUCOMA

Glaucoma: A Symposium organized by the Council for International Organizations of Medical Sciences, established under the Joint auspices of UNESCO and WHO. Edited by Sir Stewart Duke-Elder. Pp. 350 + x, with illustrations. 37s. 6d. London: English Universities Press Ltd. 1955.

Contents: 1. Anatomy, Physiology and Pathology of the Vascular Circulation in Glaucoma. 2. The Dynamics of the Intra-Ocular Fluid. 3. The Resistance to the Outflow of the Aqueous Humour. 4. Gonioscopy. 5. Provocative Tests. 6. Clinical Aspects. 7. General Discussion and Conclusions. Appendices.

This symposium on glaucoma, edited by Sir Stewart Duke-Elder and contributed to by many other noted ophthalmologists, can well be regarded as a monument to the progress made by these scientists on this very common condition, which, as regards treatment, is yet the most difficult and unsatisfactory condition that the ophthalomologist has to cope with.

The first portion of the book on anatomy, physiology and the dynamics of intra-ocular fluid, is highly academic; and although the practising ophthalmologist may find it rather strenuous reading, it is excellent material for the ophthalmological student preparing for higher examinations. The latter portion of the book on gonioscopy, provocative test, and clinical aspects, will be found most useful and I can well advise ophthalmologists to read those chapters.

The discussions on the various problems by these noted surgeons will be found very interesting, and are clearly evidence of the great amount of work that is being done in this subject.

One can only congratulate them on their work and hope that in the near future further light will be thrown on the yet unsolved problems of glaucoma. A.V.

DIFFERENTIAL DIAGNOSIS

Differential Diagnosis: The Interpretation of Clinical Evidence. By A. McGehee Harvey, M.D. and James Bordley III, M.D. Pp. 665 + xiv. Philadelphia & London: W. B. Saunders Company. 1955.

Contents: 1. Introduction. 2. Aortic Insufficiency. 3. Heart Failure. 4. Pain in the Chest. 5. Sudden Death. 6. Failure of Urinary Excretion. 7. Hematemesis and Melena. 8. Jaundice. 9. Hepatomegaly and Ascites. 10. Lymphadenopathy and Splenomegaly. 11. Fever of Obscure Origin. 12. Diseases Involving the Lungs or Mediastinum. 13. Meningitis. 14. Special Diagnostic Problems, Including the Diagnosis of Certain rare Diseases. 15. Unknown Cases for Study. General Index.

The plan of this book is rather unusual. It aims at teaching differential diagnosis by means of the clinico-pathological case conference. These conferences have been held at the Johns Hopkins Medical School for many years. They are teaching exercises for medical students rather than staff conferences and have thus been selected to illustrate principles rather than particular diseases.

Each chapter starts with a short general discussion of the diagnostic implications of the subject and usually contains a classification of the conditions considered and the methods by which they can be recognized. A number of illustrative cases follow. Clinical histories, physical and special examinations, and progress notes, are given. These are condensed versions of the abstracts prepared for the conferences, as are the autopsy findings and conclusions which follow. Thus the student is able to follow the process of differential diagnosis as it was actually employed.

Approximately 90 cases have been included in the book and on the whole the selection is a well balanced one. Most of these could be encountered by any general physician in any general medical ward and might be selected by a teacher for a final-year class in medicine. Rare and exotic diseases occur only infrequently.

With this book a keen and enthusiastic student could take himself on a mental ward-round and test his diagnostic skill. When he feels really proficient he can tackle the 11 'unknowns' at the end of the book. What a pity he cannot learn the elicitation of the physical signs by the same means! Practitioners who are cut off from large centres and who feel they are a little bit 'rusty' might also appreciate this somewhat unusual 'refresher course'.

C.M

BOOKS RECEIVED : BOEKE ONTVANG

Textbook of Occupational Therapy. With Chief Reference to Psychological Medicine. By Eamon N. M. O'Sullivan, B.A., M.B., D.P.M. Pp. 319 + x, with illustrations. 21s. 0d. London: H. K. Lewis & Co. Ltd. 1955.

Ophthalmology. A Textbook for Diploma Students. By Patrick D. Trevor-Roper, M.A., M.B., B.Chir. (Cantab.), F.R.C.S., D.O.M.S. (Eng.). Pp. 656 + xii, with illustrations. 75s. 0d. London: Lloyd-Luke (Medical Books) Ltd. 1955.

Breast Cancer and its Diagnosis and Treatment. By Edward F. Lewison, B.S., M.D., F.A.C.S. Pp. 478 + xii, with 181 illustrations and 4 coloured plates. 114s. 0d. London: Baillière, Tindall & Cox Ltd.

Diagnosis of Congenital Heart Disease. A Clinical and Technical Study by the Cardiologic Team of the Pediatric Clinic Karolinska Sjukhuset, Stockholm Pp. 649 + xv, with 581 illustrations Chicago: The Year Book Publishers, Inc. 1955.

Counseling in Medical Genetics. By Sheldon C. Reed. Pp. 268 + viii. $4.00. Philadelphia & London: W.B. Saunders Company. 1955.

One in Six. An Outline of the Cancer Problem. By I. Hieger, D.Sc. Pp. 80, with illustrations. 12s. 6d. London: Allan Wingate. 1955.

Thoracic Surgical Management. Second Edition. By J. R. Belcher, M.S., F.R.C.S. and I.W.B. Grant, M.B. (Edin.), F.R.C.P. (Edin.). Pp. 216 + ix, with 78 illustrations. 21s. 0d. London: Baillière, Tindall & Cox Ltd. 1955.

Genital Prolapse and Allied Conditions. By Percy Malpas, Ch.M. (Liverpool), F.R.C.S. (Eng.), F.R.C.O.G. Pp. 199 + vii, with 37 illustrations. 47s. 6d. London: Harvey & Blythe Ltd. 1955.

The Mentally Retarded Child. A Guide for Parents. By Abraham Levinson, M.D. Pp. 128. 12s. 6d. London: George Allen & Unwin Ltd. 1955.

The Pregnancy Toxaemias or the Encymonic Atelositeses. By G. W. Theobald, M.A., M.D. (Cambridge), F.R.C.S. (Edin.), F.I.C.S., F.R.C.O.G., M.R.C.P. (Lond.). Pp. 488 + xiv, with 56 illustrations. 63s. 0d. London: Henry Kimpton. 1955.

Modern Medical Monographs: Polycythemia. Physiology, Diagnosis and Treatment Based on 303 Cases. By John H. Lawrence, M.D., D.Sc., F.A.C.P. Pp. 136 + viii, with 38 illustrations. $5.50. London & New York: Grune & Stratton, Inc. 1955.

A New Classification of Tuberculosis with New Diagnostic Standards. By Milosh Sekulich, M.D. Pp. 63. 3s. 6d. London: William Heinemann Medical Books Ltd. 1955.

World Health Organization Technical Report Series No. 93. Expert Committee on Midwifery Training. First Report. Pp. 21. 1s. 9d. Geneva: World Health Organization. 1955.

World Health Organization Technical Report Series No. 92. Joint ILO/WHO Committee on the Hygiene of Seafarers. Second Report. Pp. 20. 1s. 9d. Geneva: World Health Organization. 1955.

De Medische Geschiedenis van Een Infanterie-Bataljon der Koninklijke Landmacht Gedurende Drie Jaar Actieve Dienste op Java 1946-1950. Deur dr. F. Doeleman. Bl. 234. Geb. f. 10.50. Assen: Van Gorcum & Comp. N.V.

Addendum 1955 to the British Pharmacopoeia 1953. Published under the Direction of the General Medical Council Pursuant to the Medical Council Act 1862 and the Medical Act 1950. Official from March 1, 1956. Pp. 94 + xvii. 21s. 0d. London: The Pharmaceutical Press.

Chemotherapy of Malaria. By Sir Gordon Covell, C.I.E., M.D., G. Robert Coatney, Ph.D., John W. Field, C.M.G., M.D. and Jaswant Singh, M.B., Ch.B., D.P.H., D.T.M. &. H. Pp. 123. 17s. 6d. Geneva: World Health Organization. 1955.

Cancer Cells. By E. V. Cowdry. Pp. 677 + xvi, with 137 illustrations. £6 16s. 0d. Philadelphia & London: W. B. Saunders Company. 1955.

Office Procedures. By Paul Williamson, M.D. Pp. 412 + ix, with illustrations. £5 6s. 3d. Philadelphia & London: W. B. Saunders Company. 1955.

The Practice of Dynamic Psychiatry. By Jules H. Masserman, M.D. Pp. 790 + xxx. £5 2s. 0d. Philadelphia & London: W. B. Saunders Company. 1955.

New Concepts of Healing. Medical Psychological and Religious. By A. Graham Ikin, M.A., M.Sc. Pp. 186. 12s. 6d. London: Hodder & Stoughton. 1955.

Is That You Doctor? Tabloids out of the Medical Bag. By Imhotep. Pp. 207 + xi, with illustrations. 15s. 0d. Cape Town: Howard B. Timmins. 1955.

The British Encyclopaedia of Medical Practice. Including Medicine, Surgery, Obstetrics, Gynaecology and Other Special Subjects: Medical Progress 1955. Editor in Chief: The Lord Horder, G.C.V.O., M.D., F.R.C.P. Pp. 311 + vi. London: Butterworth & Co. (Publishers) Ltd., South African Office—Butterworth & Co (Africa) Ltd., Durban. 1955.

American Practitioner Digest of Treatment. A monthly periodical. Annual subscription 80s. 0d. plus postage. Philadelphia & Montreal: J. B. Lippincott Company.

CORRESPONDENCE : BRIEWERUBRIEK

DIPHTHERIA AND WHOOPING COUGH IMMUNIZATION IN BECHUANALAND

To the Editor: I am grateful for your notice in the *Journal* of the proposed mass inoculation campaign against whooping cough and diphtheria which the Bechuanaland Protectorate Government in conjunction with UNICEF proposes to undertake in 1956/57.

The intention is to inoculate against diphtheria and whooping cough all children up to the age of 6 years and to inoculate against diphtheria only, all children and adolescents between the ages of 6 and 18 years.

M. L. Freedman
Director of Medical Services

Medical Department
Bechuanaland Protectorate
P.O. Box 106
Mafeking
19 October 1955

FINAL-YEAR GROUP PHOTOGRAPHS

To the Editor: I would like, through the medium of the *Journal*, to enquire whether any graduates in medicine of the University of Cape Town are in possession of final-year group photographs for the years 1923, 1925, 1927, 1933 or 1947, which they would be willing either to give to us or to lend for copying.

We are anxious to fill these gaps in our collection of photographs of graduates since the first M.B., Ch.B. degrees were awarded in 1922.

A. Marais Moll
Dean of the Faculty of Medicine

University of Cape Town
28 October 1955